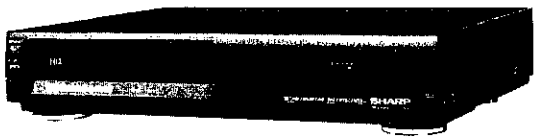
SHARP SERVICE MANUAL

S29X6VC-780E/

VHS VIDEO CASSETTE RECORDER



MODELS VC-780E VC-790ET

In the interests of user-safety (Required by safety regulations in some countries) the set should be restored to its original condition and only parts identical to those specified should be used.

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SHARP CORPORATION

SPECIFICATIONS

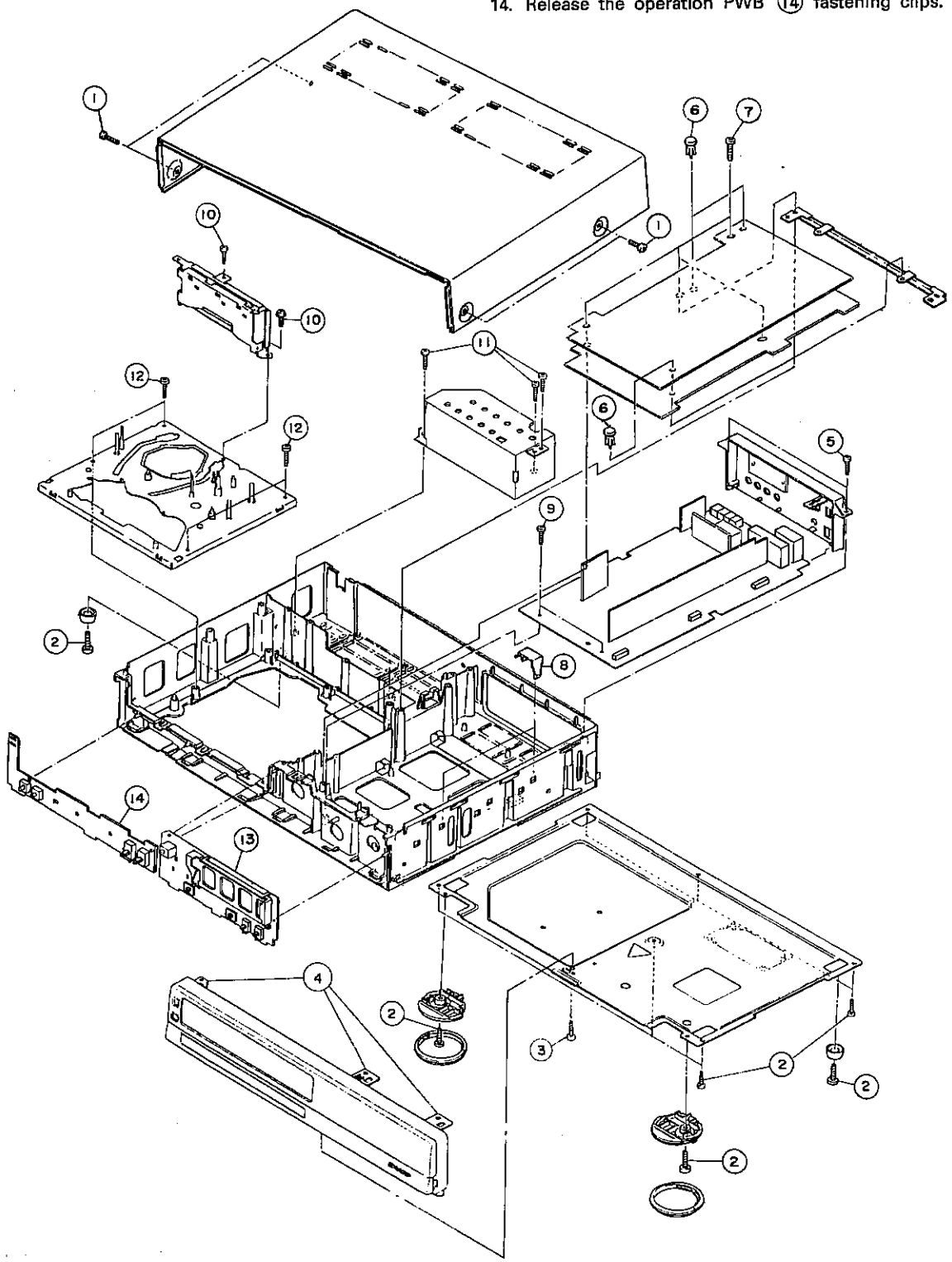
Format:	VHS standard
Video recording system:	Rotary two-head helical scan system with slant double-azimuth combination video head.
Video signal: PAL:	PAL System-B/G (P.B/REC)
PAL:	PAL System-I (P.B/REC)
PAL:	PAL System-D (P.B/REC)
SECAM:	MESECAM System (P.B/REC)
SECAM:	SECAM System-B/G (P.B/REC)
SECAM:	SECAM System-D/K (P.B/REC)
NTSC:	NTSC 4.43 (P.B/REC)
NTSC:	NTSC 3.58 (P.B/REC)
Recording playing time:	240 min max.with SHARP E-240 tape (PAL/MESECAM/SECAM in SP mode) 8 hours max. with SHARP E-240 tape (PAL/MESECAM/SECAM in LP mode) 160 min max.with SHARP T-160 tape (NTSC in SP mode) 320 min max.with SHARP T-160 tape (NTSC in LP mode) 8 hours max. with SHARP T-160 tape (NTSC in EP mode)
Tape width:	12.7 mm
Tape speed:	23.39 mm/sec. (PAL in SP mode) 33.35mm/msec. (NTSC in SP mode) 11.7mm/sec. (PAL in LP mode) 16.68mm/sec. (NTSC in LP mode) 11.12 mm/sec. (NTSC in EP mode)
Antenna:	75 ohm unbalanced
Receiving channel:	VHF E2~ E12, (44.25MHz ~294.25MHz) UHF E21~ E69, (471.25MHz ~885.25MHz)
RF converter output signal:	UHF Channel E30 ~ E39 (adjustable). Preset to Channel E36 UHF Channel US26~US38(adjustable). Preset to Channel US34 UHF Channel J25~J37 (adjustable). Preset to Channel J33
Power requirement:	AC 100~240V, AUTO 50/60 Hz
Power consumption:	Approx. 23W (at AC 220V 50Hz)
Operating temperture:	5°C to 40°C
Storage temperature:	- 20°C to 55°C
Weight:	5.8 kg
Dimensions:	430 mm (W) × 350 mm (D) × 89 mm (H)
VIDEO	
Input:	1.0 Vp-p, 75 ohm
Output:	1.0 Vp-p, 75 ohm
AUDIO	0 dB = 0.775 Vrms
Input:	Line: - 8 dB, more than 50k ohm) at RCA terminal
Output:	Line: - 5 dB, less than 1k ohm)
AUDIO	0 dB = 0.775 Vrms
Input:	Line: - 3.8 dB, more than 50k ohm) at Pin 21 terminal
Output:	Line: - 3.8 dB, less than 1k ohm)
Accessories included:	Antenna 75 ohm coaxial connector cable (plug provided) Operation Manual Infrared Remote control

As part of our policy of continuous improvement, we reserve the right to alter design and specifications without notice.

Note: The antenna must correspond to the new standard DIN 45325 (IEC 169 - 2) for combined UHF/VHF antenna with 75 ohm connector.

DISASSEMBLY AND REASSEMBLY

1. Remove the four upper cabinet fastening screws (1).
2. Remove the six bottom panel fastening screws (2).
3. Remove the one front panel fastening screw (3).
4. Release the three clips (4) and remove the front panel.
5. Remove the two antenna terminal cover fastening screws (5).
6. Remove the tow push rivets which fasten the syscon servo unit and the angle.
7. Remove the four syscon servo unit fastening screws (7).
8. Remove the Y/C PWB holder (8).
9. Remove the two main PWB fastening screws (9).
10. Remove the two head amp PWB fastening screws (10).
11. Remove the three power unit fastening screws (11).
12. Remove the four machanism chassis fastening screws (12).
13. Release the timer PWB (13) fastening clips.
14. Release the operation PWB (14) fastening clips.

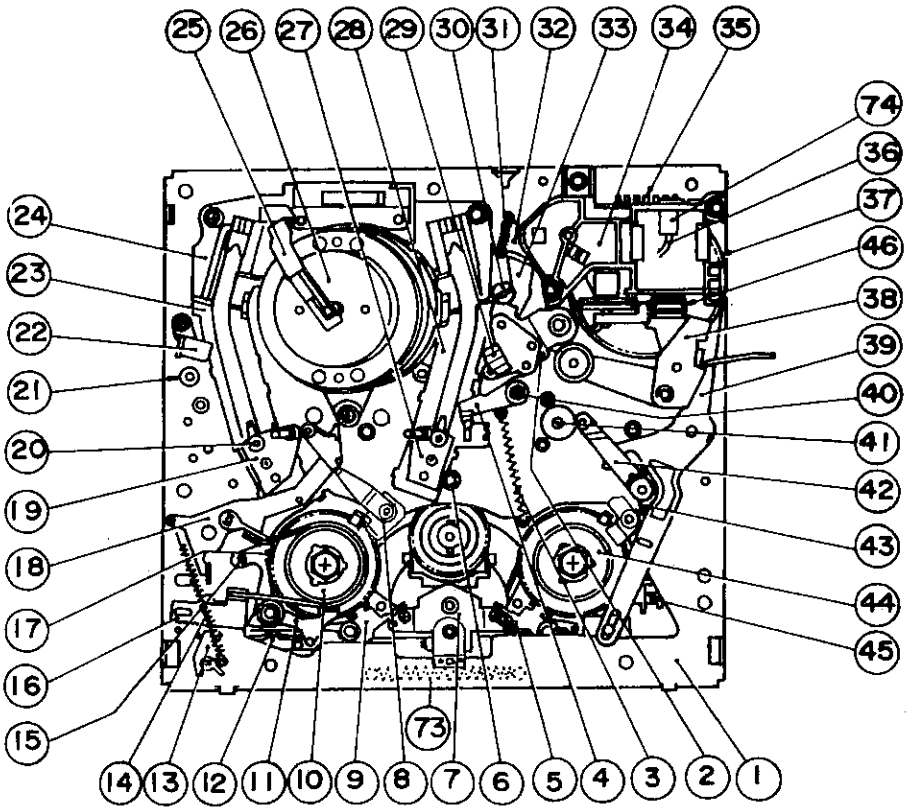


LOCATION LIST OF MECHANICAL PARTS

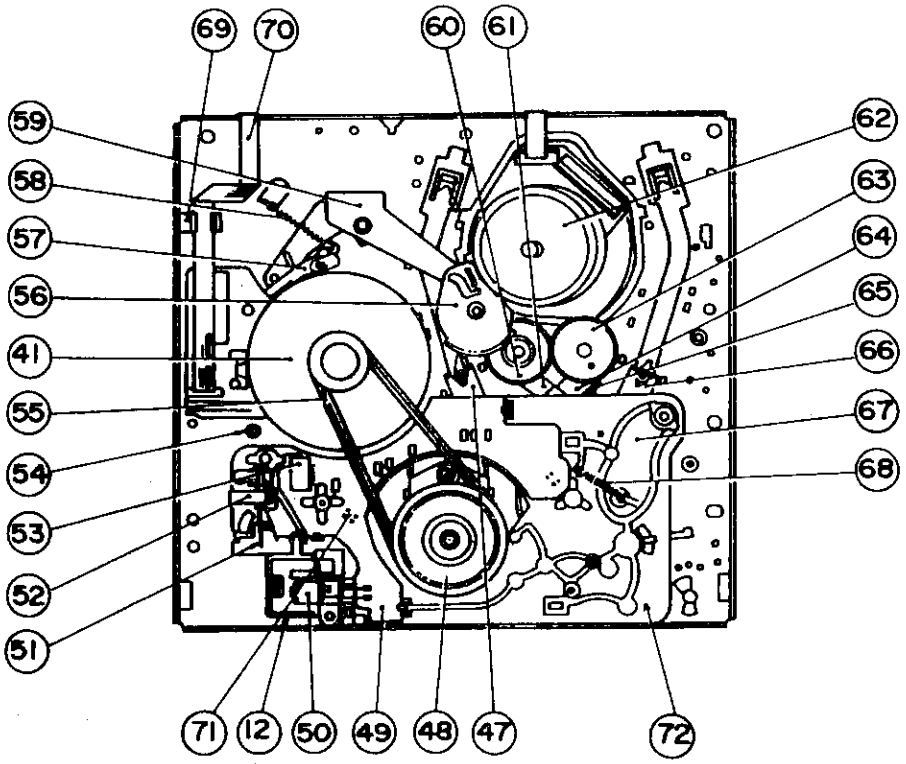
No.	Part Name	No.	Part Name
1	Main chassis ass'y	38	Pinch roller lever ass'y
2	A/C head arm	39	Relay shifter lever
3	Half-loading lever spring	40	Retaining guide
4	Half-loading lever	41	Capstan D.D.motor
5	Main take-up brake lever	42	Reverse guide
6	Cassette LED	43	Reverse guide spring
7	Idler gear ass'y	44	Take-up reel disk
8	Supply reel stopper ass'y	45	Video search brake lever
9	Main supply brake lever	46	Loading belt
10	Supply reel disk	47	Take-up pole base slider
11	Back tension lever	48	Reel pulley
12	Brake shifter	49	Reel sensor PWB
13	Tension spring hook plate	50	Brake solenoid
14	Tension spring	51	Shifter spring
15	Tension release lever	52	Shifter spring cover
16	Tension band ass'y	53	Connector
17	Auxiliary fast forward brake lever	54	Reverse guide spring
18	Tension arm ass'y	55	Reel belt
19	Supply pole base ass'y	56	Loading relay gear
20	Guide roller ass'y	57	Slow brake lever
21	Supply impedance roller	58	Slow brake spring
22	Full erase head ass'y	59	Relay gear drive lever
23	Supply loading rail	60	Take-up loading gear
24	Drum base	61	Take-up loading arm ass'y
25	Earth brush ass'y	62	Drum D.D. motor ass'y
26	Drum ass'y	63	Supply loading gear
27	Take-up pole base ass'y	64	Supply loading arm ass'y
28	Take-up loading rail	65	Loading reciprocating spring
29	A/C head ass'y	66	Supply pole base slider
30	X-position adjusting nut	67	Reel block chassis
31	Half-loading reciprocating spring	68	Auxiliary fast forward brake spring
32	Half-loading reciprocating lever	69	Full flat cable holder
33	Half-loading drive lever	70	Full flat cable(Drum D.D. motor)
34	Loading block ass'y	71	Reel sensor
35	Cam switch	72	Reel block
36	Loading motor	73	Main brake spring
37	Master cam	74	Dew sensor

LOCATION OF MECHANICAL PARTS

- TOP VIEW



- BOTTOM VIEW



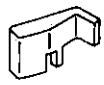
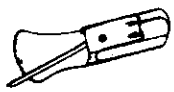
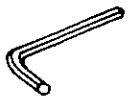
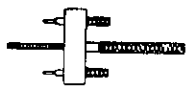
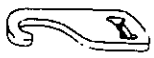
ADJUSTMENT, REPLACEMENT, ASSEMBLY AND CLEANING OF MECHANICAL UNITS

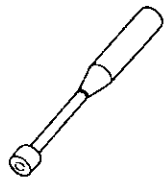
Here we will describe a relatively simple service work in the field, not referring to the more complicated repairs which would require the use of special equipment and tools (drum assembly or replacement, for example).

We are sure that the easy-to-handle tools listed below would be more than handy for periodical maintenance to keep the machine in its original efficient condition.

TOOLS NECESSARY FOR ADJUSTING THE MECHANICAL UNITS

The following tools are required for proper service and satisfactory repair.

No.	Jig Item	Part No.	Code	Configuration	Remarks
1	Reel Disk Height Adjusting Jig	JiGRH0002	BR		These Jigs are used for checking and adjusting the reel disk height.
2	Master Plane Jig	JiGMP0001	BY		
3	A/C Head Tilt Adjusting Jig	JiGACH-F18	BU		This Jig is used for settimg the A/C head tilt.
4	Torque Gauge (90g)	JiGTG0090	CM		These Jigs are used for checking and adjusting the torque of take-up and supply reel disks.
	Torque Gauge (1.2 kg)	JiGTG1200	CN		
5	Gauge Head	JiGTH0006	AW		
6	Cassette Torque Meter	JiGVHT-063	CZ		This cassette torque meter is used for checking and adjusting the torque of take-up and supply reel and for measuring tape back tension.
7	Tension Gauge (300g)	JiGSG0300	BF		There are two Gauges used for the tension measurements, 300 g and 2.0 kg.
	Tension Gauge (2.0 kg)	JiGSG2000	BS		
8	Hex Wrench (0.9 mm)	JiGHW0009	AE		These Jigs are used for loosening or tightening special Hexagon type screws.
	Hex Wrench (1.2 mm)	JiGHW0012	AE		
	Hex Wrench (1.5 mm)	JiGHW0015	AE		
9	Alignment Tape (PAL)	VROCPSV	CK		This tape is especially used for electrical fine adjustment.
10	Drum Replacing Jig	JiGDT-0001	BG		This is used for replacement of the VCR's upper drum.
11	Tension Gauge Adapter	JiGADP003	BK		This Jig is used for the tension gauge. Rotary Transformer Clearance Adjusting Jig.

No.	Jig Item	Part No.	Code	Configuration	Remarks
12	Special Bladed Screwdriver	JiGDRiVERH-4	AP		This Screwdriver is used for adjusting the guide roller height and X-position.
13	Tension Band and Plate Adjusting Jig	JiGDRiVER-6	BM		This Jig is used for adjusting the tension band and tension plate.
14	Torque Driver	JiGTD1200	CB		This is used to screw down resin-made parts: the specified torque is 5 kg.
15	Box Driver	JiGDRiVER110-7	AS		This Jig is used for height adjustment of the A/C head.
		JiGDRiVER110-4	AV		This Jig is used for height adjustment of the retaining guide.
16	Retaining Guide Height Adjusting Jig	JiGGH-F18	BU		This Jig is used for height adjustment of the retaining guide.
17	Reverse Guide Height Adjusting Jig	JiGRVGH-F18	BU		This Jig is used for height adjustment of the reverse guide.

NOTE:
Current JiGMA0001 contains Master Plane (JiGMP0001) and Disk Height Adjusting Jig (JiGRH0001). Even though new Disk Height Adjusting Jig (JiGRH0002) covers greater height, this new Jig (JiGRH0002) can be used for current JiGRH0001, but current Jig (JiGRH0001) cannot be used as JiGHR0002.Master Plane (JiGMP0001)can be used with JiGRH0001 and JiGRH0002 as well.

MECHANICAL PARTS REQUIRING PERIODICAL INSPECTION

Use the following table as a guide to maintain the mechanical parts in good operating condition.

Parts \ Maintained every	500 hrs.	1000 hrs.	1500 hrs.	2000 hrs.	3000 hrs.	Remarks
Guide roller ass'y	□	□	□	□	□	Abnormal rotation or significant vibration requires replacement.
Supply impedance roller	□	□	□	□	□	
Supply impedance roller (inner)		□		□	□	Clean with pure high quality isopropyl alcohol.
Supply impedance roller flange	□	□	□	□	□	Clean tape contact area with the specified cleaning liquid.
Retaining guide	□	□	□	□	□	
Slant pole	□	□	□	□	□	
Video head	□	○□	□	○□	○□	Clean tape contact area with the specified cleaning liquid.
Full-erase head	□	□	□	□	□	
A/C head	□	□	□	□	□	
Pinch roller	□	□	□	□	○□	Clean rubber and rubber contact area with the specified cleaning liquid.
Reel belt		□		□		
Loading belt		□		○		
Capstan loading belt		□		○		
Reel block*				○		
Tension band ass'y					○	
*See the table below for servicing the reel block parts.						
Supply/take-up reel disks		□ △		□△○		Clean with pure high quality isopropyl alcohol.
Video serch brake lever				○		
Idler gear ass'y				○		
Main supply/take-up brake levers				○		

NOTE: ○: Part replacement.
□: Cleaning (For cleaning, use a lint-free cloth dampened with pure isopropyl alcohol).
△: Oil refilling (The indicated point should be lubricated with high quality spindle oil every 1000 hrs).

This model has no adjusting parts for torques, tension, etc. If the reading is outside the specified range, clean or replace the part.

REMOVAL AND REASSEMBLY OF CASSETTE HOUSING CONTROL ASSEMBLY

Notes:

1. During removal and reassembly, be careful not to strike the nearby guide pin, drum, etc.
2. Before removal or reassembly, be sure to unplug the recorder from the AC outlet.
3. When removing and attaching the cassette loading belt, be careful to keep it free from grease.

- **Removal**

1. Put the unit in the cassette eject position.
2. Remove the cassette loading belt ① .
3. Disconnect the FFC (Full Flat Cable) ② at the right side of the cassette housing control assembly.
   Note: Be careful not to break the FFC.
4. Remove the two cassette housing installation screws.
5. Move the cassette housing control assembly (Fig. 1-1) in the direction of arrow ⇒ Ⓑ, and pull it out straight upward.

- **Reassembly**

1. Insert the tabs of the cassette housing control assembly into the mechanism chassis, move it in the direction of arrow ⇒ Ⓐ, and secure temporarily.
   Check to see if the cassette housing control assembly is in the correct position, and then tighten the two screws (XHPS330P06WS0) .
2. Attach the cassette loading belt ①.
3. Connect the FFC ② at the right side of the cassette housing control assembly.

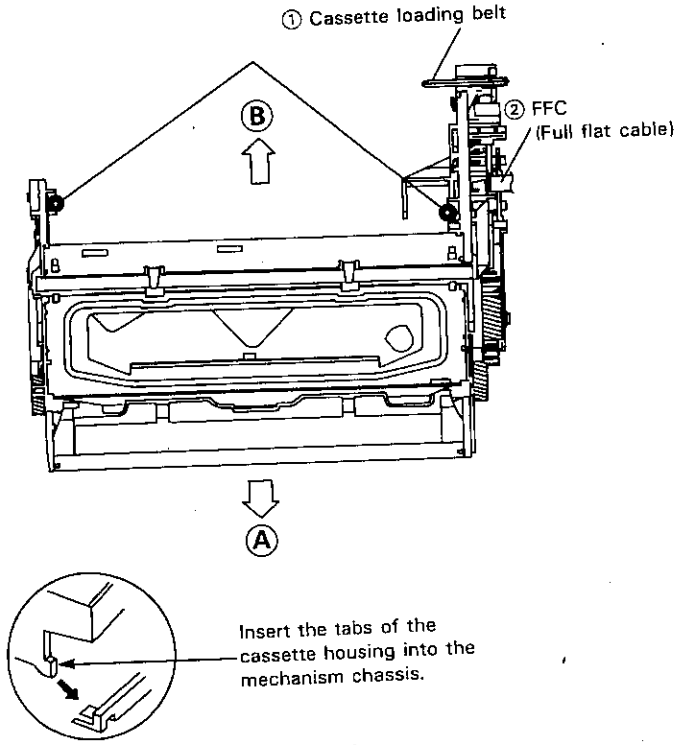


Figure 1-1.

REPLACEMENT OF WORM WHEEL ASSEMBLY

- **Removal (Fig. 1 - 2)**

1. Unsolder the cassette switch connector from the start sensor PWB ①
2. Release the two catches Ⓐon the cassette housing frame (R), and remove the PWB.
3. Unscrew one B tight screw ② to detach the worm bracket ③.
   Note: The bearing ④ can come off position too. So be careful not to let the bearing fall.
4. Remove the worm shaft assembly ⑤, pulley ⑥ and cassette loading belt ⑦ all from the cassette housing frame (R).
5. Finally pull the worm wheel assembly out of the boss of the cassette housing frame (R).

- **Reassembly (Fig. 1-2)**

1. Turn the phase gear ⑧ clockwise until the slider comes to a halt in the cassette insertion direction.
2. Set up the worm wheel gear assembly onto the boss on the cassette housing frame (R), matching the mark Ⓖ on the phase gear ⑧ with the mark Ⓗ on the worm wheel gear.
   Note: Make sure that the slider pin is in the groove of the drive gear arm.
3. Install the pulley ⑥ and apply the cassette loading belt ⑦ both on the worm shaft assembly ⑤. Couple the clutch ⑩ to the clutch lever ⑨. And mount them together in the cassette housing frame (R) .
4. Attach the worm bracket ③ to the worm shaft assembly ⑤. Place them onto the boss on the cassette housing frame (R).
5. Tighten one B tight screw ②.
   Note: Make sure that the parts Ⓒ and Ⓓ of the cassette housing frame (R) are properly engaged with the parts Ⓔ and Ⓕ of the worm bracket ③.
6. Hook the start sensor PWB① on the two positions Ⓐ on the cassette housing frame (R).
   Note: Check that the switch connector is right in the cassette switch mounting hole Ⓑ.
7. Finally resolder the cassette switch connector to the start sensor PWB.

Notes:

1. Do not overtighten the B tight screw (no more than 5.0 ± 0.5 kg. cm), because otherwise the lower threads of the screw hole at the resin-made boss may be broken.
2. Keep in mind that the clutch switching lever should be in the correct positional relation. The mechanism might malfunction even if the lever comes slightly out of position.

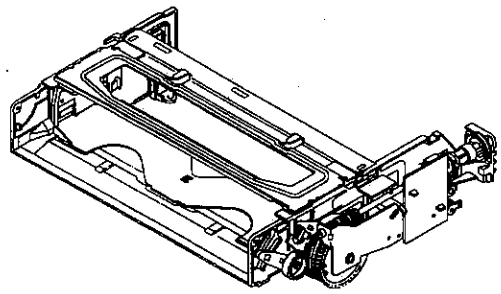


Figure 1-2 (a).

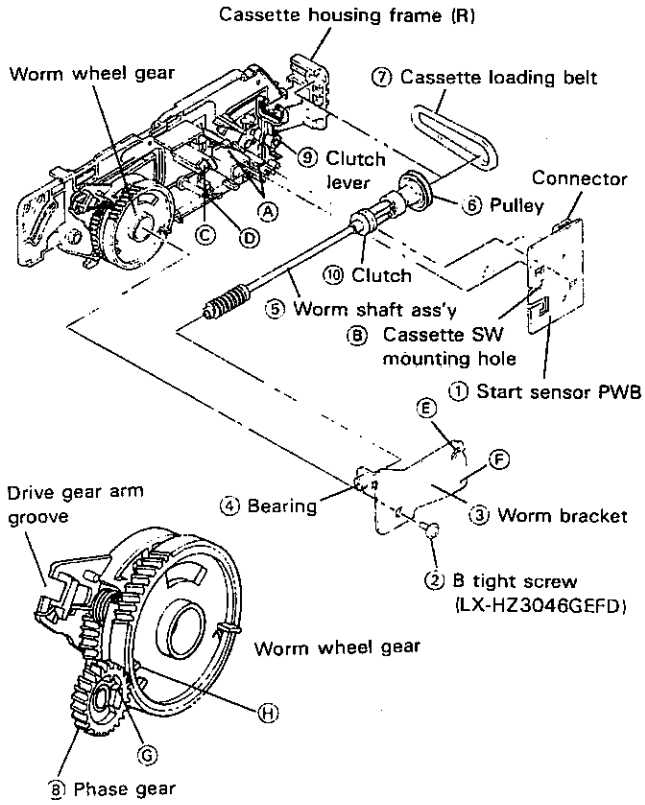


Figure 1-2 (b).

- **Reassembly of drive gear (Fig.1- 3)**

1. Pass the tip Ⓑ of the drive gear spring (R) ② through the square hole Ⓐ of the drive gear (R) ① to the hook the spring in position.
2. Hook one end Ⓓ of the reciprocating spring ③ to the catch Ⓒ of the drive gear (R) ①.
3. Hook the other end Ⓔ of the reciprocating spring ③ to the catch Ⓕ of the worm wheel ④.
4. Fit the drive gear (R) ① to the worm wheel ④ so that the catch Ⓖ and boss Ⓙ on the drive gear (R) are exactly in the square hole Ⓗ and round hole Ⓘ, Respectively, in the worm wheel.

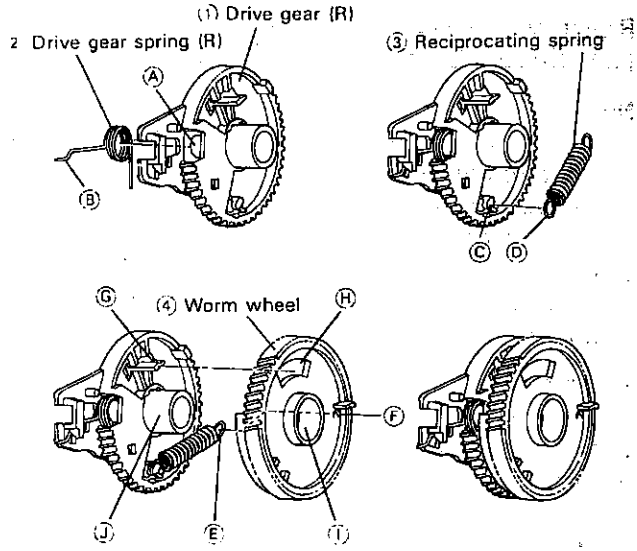


Figure 1-3.

REPLACEMENT OF CASSETTE LOADING BELT

- **Replacement (Fig. 1-4)**

1. Remove the start sensor PWB and worm bracket from the cassette housing frame (R).
2. Remove the worm shaft assembly, pulley and cassette loading belt from the cassette housing frame (R).
3. Replace the cassette loading belt with a new one.

Notes:

1. Do not overtighten the B tight screw which holds the worm bracket in position. The specified tightening torque is 5.0 ± 0.5kg. cm.
2. Make sure that the cassette loading belt, being applied in the cassette housing frame (R), is free from grease. If stained with grease, clean the belt with the specific cleaning liquid.
3. Finally check the clutch switching lever for its specified points.

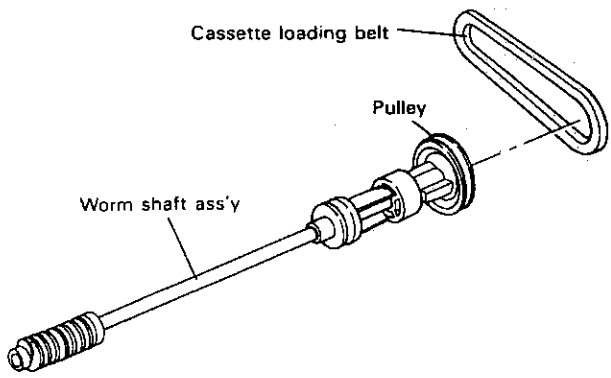


Figure 1-4.

CHECKING THE CLUTCH SWITCHING LEVER

- **Checking (Fig. 1-5)**

When removing and attaching the clutch switching lever from and to the mechanism chassis, check to see if the lever is in the position as shown below. If out of this position, malfunction might result.

1. First make sure that the rib Ⓐ of the drive gear (R) ① and the tip Ⓑ of the switch lever ② are in their correct positions.
2. Check also that the rib Ⓒ of the cassette housing frame (R) and the catch Ⓓ of the clutch lock lever ③ are in their proper positions.
3. Finally be sure that the positional relations between the clutch lever ④ and the clutch ⑤, as well as between the clutch ⑤ and the pulley ⑥, are as specified.

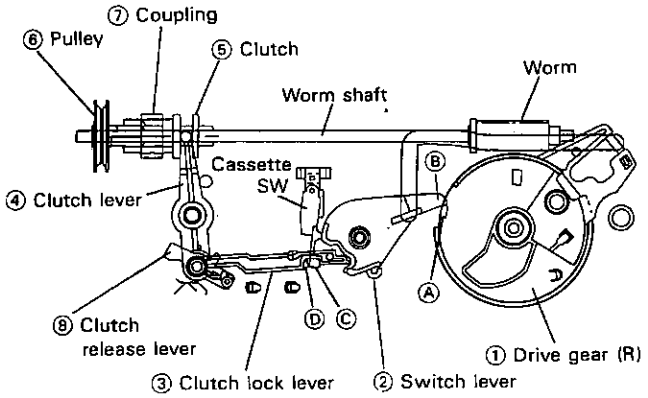


Figure 1-5.

- **Resetting (Fig. 1-6)**

Take the following steps to reset the clutch ⑤ if it is unlocked or if the switch lever ② and clutch lock lever ③ are unlocked.

1. Turn the coupling ⑦ clokwise (as viewed from the front of the set) until the slider comes to the position indicated below.
   Note: Notice that the slider is equipped with a lock mechanism. Unlock the slider, therefore, before shifting the slider.

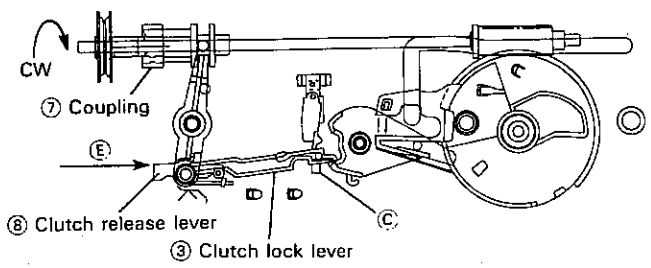


Figure 1-6.

2. Now push the clutch release lever Ⓑ in the direction of arrow Ⓔ by hand until the clutch lock lever ③ becomes tightly locked by the part Ⓒ of the cassette housing frame (R).
3. Then turn the coupling ⑦ counterclockwise until the slider reaches the cassette insertion opening and the reciprocating spring is activated.
   Note: There is no need to lock the slider. Just keep shifting the slider.

REPLACEMENT OF LOCK RELEASE LEVER

- **Removal (Fig. 1-7)**

1. Turn the coupling clockwise until the slider ① comes to the cassette down position.
   Note: Before shifting, unlock the slider.
2. Slightly widen the cassette housing frames (R) and (L) to unhook the parts Ⓐ of the slider holders (R) and (L) off the grooves of the above frames.
3. Press the catch Ⓑ on the slider holder (R) ②, and let the slider ① go off this holder in the direction of arrow Ⓒ.
4. Take the lock release lever ass'y ③ out of the slider holder (R) ② .

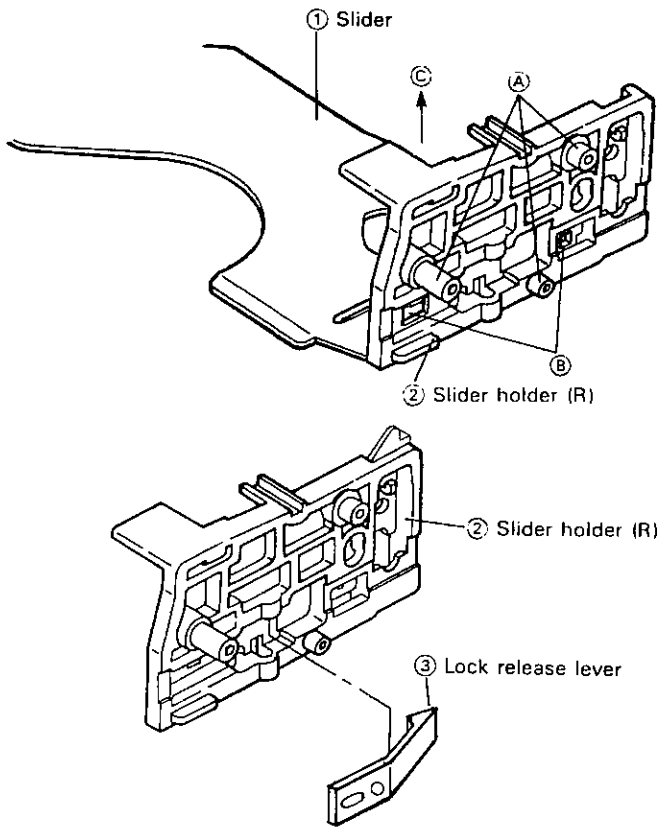


Figure 1-7.

- **Reassemdly (Fig. 1-7)**

1. Attach the lock release lever ass'y ③ to the slider holder (R) ② .
2. Fit the slider holder (R) ② to the slider ①.
3. Slightly widen the cassette housing frames (R) and (L), and set the parts Ⓐ of the slider holders (R) and (L) to the grooves of the cassette housing frames (R) and (L).
   Note: Make sure of the following fitting: Fitting between the parts Ⓐ of the slider holders (R) and (L) and the grooves of the cassette housing frames (R) and (L), as well as between the drive gear arms and the slider holders (R) and (L).
4. Turn the coupling counterclockwise until the slider ① comes to the cassette insertion opening.

TO RUN A TAPE WITHOUT THE CASSETTE HOUSING CONTROL ASSEMBLY

1. Open the lid of a cassette tape by hand and hold it with a piece of vinyl tape.
2. Set the cassette tape in the tape mechanism.Then, stabilize the cassette tape with a weight (500g or less).
   Note: The weight should not be more than 500g.

REMOVAL AND HEIGHT ADJUSTMENT OF REEL DISKS

- **Removal of supply reel disk:**

1. Remove the cassette housing control assembly.
2. Set the mechanism in the playback mode with no cassette tape in place. Unplug the power cord.
3. Remove the tension band ⑧.
4. Unscrew the screw ⑩ and release the cassette housing control ground spring ⑫ off the reel disk catch ①.
5. Release the supply reel disk catch ① and back tension lever ②. Pull out the supply reel disk ③ upward.

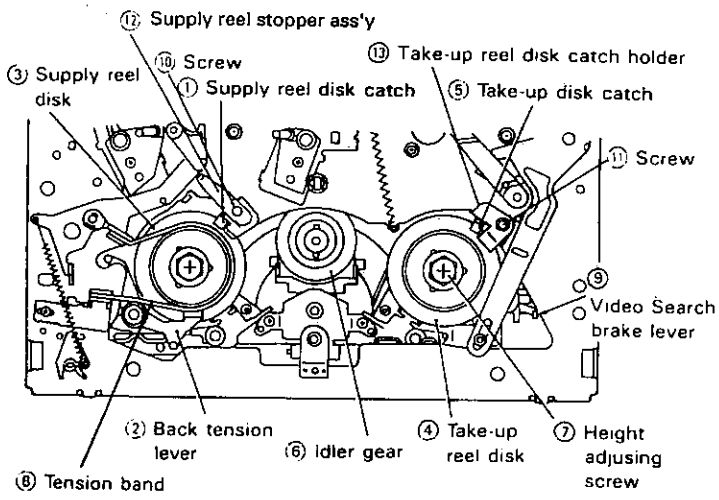


Figure 1-8.

- **Removal of take-up reel disk:**

1. Remove the cassette housing control assembly.
2. Set the mechanism in the playback mode with no cassette tape in place. Unplug the power cord.
3. Unscrew the screw ⑪ and release the take-up reel disk catch holder ⑬ off the reel disk catch ⑤.
4. Release the take-up reel disk catch ⑤. Pull out the take-up reel disk ④ upward.

Notes:

1. After replacing either of the reel disks, be sure to perform the height adjustment procedure.
2. Take care not to deform the tension hand.
3. Be careful not to deform the back tension lever, main supply / take - up brake levers, video search brake lever and auxiliary fast forward brake. (See pages 4 and 5.)
4. Check the tension pole position. (See pages 15.)
5. Be careful not to damage the supply reel disk, take-up reel disk and idler gear ⑥.
6. Whenever replacing, clean and lubricate the reel disk shaft.

- **Reassembly of supply reel disk:**

1. Clean the reel disk shaft and apply oil (high quality spindle oil) to it, then install a new supply reel disk onto the shaft.
2. Replace the cassette housing control ground spring ⑫ in position and tighten up the screw ⑩.
3. Replace the tension band ⑧.
4. Adjust the reel disk height by using the master plane and reel disk height adjusting jig.

- **Reassembly of take-up reel disk:**

1. Clean the reel disk shaft and apply oil (high quality spindle oil) to it. Then, release the video search brake lever and install a new take - up reel disk onto the shaft.
2. Replace the take-up reel disk catch holder ⑬ in position and tighten up the screw ⑪ .
3. Adjust the reel disk height by using the master plane and reel disk height adjusting jig.

Notes:

1. During removal and reassembly, be careful not to damage the reel disks, reel shafts, idler gear and brake levers.
2. After reassembly, check the back tension in video search rewind mode (see page 14) and checking the brake torque (see page 16)

HEIGHT ADJUSTMENT

1. Remove the cassette housing assembly, and place the master plane onto the mechanism unit as shown in Fig.1-9 (a), taking care not to hit the drum.
2. Ensure that the reel disk is lower than the part Ⓐ but higher than the part Ⓑ of Fig. 1-9 (b), by using the reel disk height adjusting jig. If the height is not correct, adjust the height adjusting screw.
   Note: Whenever replacing the reel disk, perform the height adjustment.

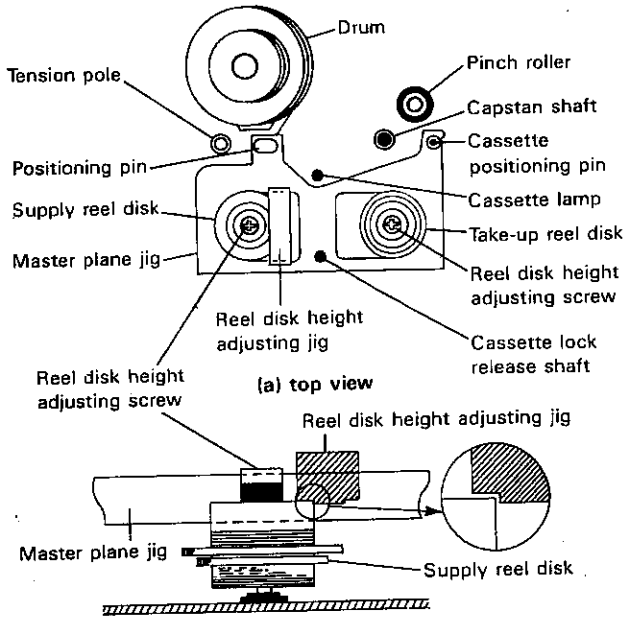


Figure 1-9.

CHECKING AND ADJUSTMENT OF TAKE-UP TORQUE IN FAST-FORWARD MODE

Notes:

1. When setting the torque gauge on the take-up reel disk and pushing the fast-forward button to start the reel disk turning, take care that the torque-gauge does not fly off.
2. The checking and adjustment should be carried out without a video cassette tape in place.

- **Checking**

1. Remove the cassette housing assembly.
2. Place the torque gauge on the take-up reel disk and push the fast-forward button to place the unit in the fast-forward mode.
3. Turn the torque gauge slowly (one rotaion every 2 to 3 seconds) by hand in the take-up direction and check that it indicates 700 g.cm or more.

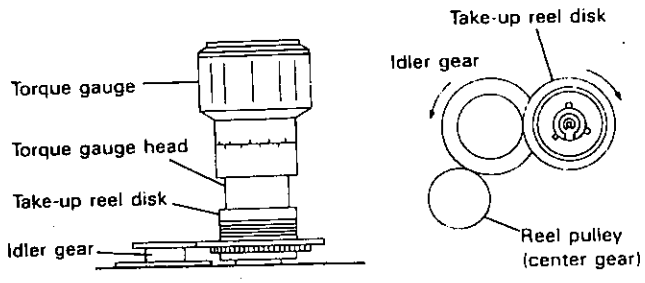


Figure 1-10.

- **Adjustment**

If the take-up torque is outside the specified range, clean the capstan D.D. motor pulley, reel belt and reel pulley with cleaning liquid, then recheck the torque.
If the take-up torque is still out of specification, replace the reel belt.

CHECKING AND ADJUSTMENT OF TAKE-UP TORQUE IN REWIND MODE

Notes:

1. When setting the torque gauge on the supply reel disk and pushing the rewind button to start the reel disk turning, take care that the torque gauge does not fly off.
2. When checking the take-up torque, do not keep the reel disk locked for a longer time.

- **Checking**

1. Remove the cassette housing assembly.
2. Place the torque gauge on the supply reel disk and push the rewind button to place the unit in the rewind mode.
3. Turn the torque gauge slowly (one rotation every 2 to 3 seconds) by hand in the take-up direction and check that in indicates 700 g.cm or more.

- **Adjustment**

If the take-up torque is outside the specified range clean the capstan DD motor pulley, reel belt and reel pulley with cleaning liquid, then recheck the torque.
If the take-up torque is still out of specification, replace the reel belt.

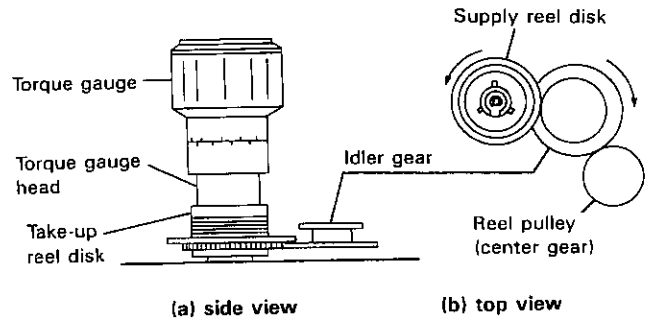


Figure 1-11.

CHECKING OF TAKE-UP TORQUE IN PLAY-BACK MODE

- **Checking**

Load a cassette torque meter (JiGVHT-063) into the unit and push the record button to place the unit in the record mode. Then check that the torque is as specified;

torque: 95 ± 30 g.cm

Note:
The measured torque fluctuates due to the rotational deviation of the reel drive unit. Use the center of the fluctuating range as the measured value.

1. If the take-up torque in playback mode is outside the specified value, replace the take-up reel disk.
2. Push the record button to place the unit in the record mode, and check that the take-up torque is within the specified range.

CHECKING OF TAKE-UP TORQUE IN VIDEO SEARCH REWIND MODE

- **Checking**

Load a cassette torque meter (JiGVHT-063) into the unit and push the play and video search rewind buttons to place unit in the video search rewind mode.
Then check that the torque is as specified;
torque in video search rewind mode : 170 ± 40 g.cm

Note:
The measured torque fluctuates due to the rotational deviation of the supply reel disk. Use the center of the fluctuating range as the measured value.

1. If the take-up torque in video search rewind mode is outside the specified range, replace the supply reel disk.

CHECKING THE FAST FORWARD BACK TENSION

Note:
Set the torque gauge securely on the supply reel disk; if the torque gauge is loose above the reel disk, an inaccurate measurement will result.

- **Checking**

1. Remove the cassette housing assembly.
2. Push the fast forward button to place the unit in the fast forward mode.
3. Place the torque gauge on the supply reel disk, and turn it clockwise very slowly (one rotation every 2 to 3 seconds) and check that the torque is within 15 ± 5 g.cm.

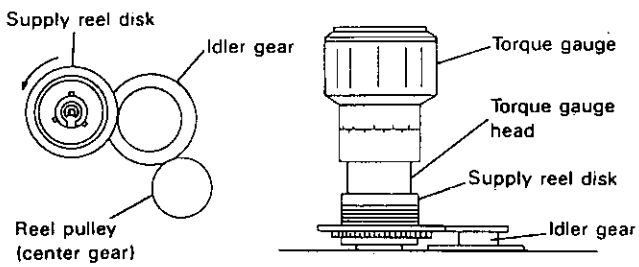


Figure 1-12.

CHECKING THE REWIND BACK TENSION

Note:
Set the torque gauge securely on the take-up reel disk; if the torque gauge is loose above the reel disk, an inaccurate measurement will result.

- **Checking**

1. Remove the cassette housing assembly.
2. Push the rewind button to place the unit in the rewind mode.
3. Place the torque gauge on the take-up reel disk, and turn it counterclockwise very slowly (one rotation every 2 to 3 seconds) and check that the torque is within 15 ± 5 g.cm.

CHECKING THE VIDEO SEARCH REWIND BACK TENSION

Note:
Set the torque gauge securely on the take-up reel disk; if the torque gauge is loose above the reel disk, an inaccurate measurement will result.

- **Checking**

1. Remove the cassette housing assembly.
2. Push the play button to place the unit in the playback mode.
3. Push the video search rewind button to place the unit in the video search rewind mode.
4. Place the torque gauge on the take-up reel disk, and turn it counterclockwise very slowly (one rotation every 2 to 3 seconds) and check that the torque is within 40 ± 10 g.cm.

CHECKING THE PINCH ROLLER PRESSURE

1. Remove the cassette housing assembly.
2. Push the play button to place the unit in the playback mode.
3. Hook the tension gauge adapter around the pinch roller shaft.
4. Using a tension gauge, pull the pinch roller in the direction of arrow ⇒ Ⓐ so that the pinch roller moves away from the capstan shaft.
5. Gradually release the pressure in the direction of arrow⇒ Ⓑ to allow the pinch roller to touch the capstan shaft. When the pinch roller just touches the capstan shaft, read the indication on the gauge.
6. Check that the reading of the tension gauge is in the range of 1000 to 1200 gr.

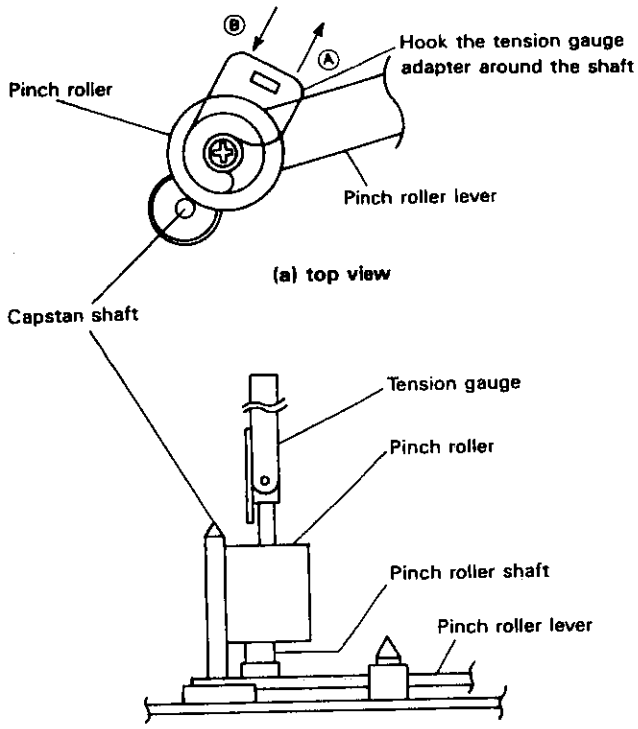


Figure 1-13.

ADJUSTMENT OF TENSION POLE

- **Position checking (Fig. 1-14)**

1. Remove the cassette housing assembly.
2. Set a video cassette tape and push the record button to place the unit in the record mode.
3. The pole bases (see page 4; item 19 and 27.) operate to bring the tape outside the cassette housing and simultaneously the tension pole moves to the left, loading the tape. At that time (loading mode), check the position of the tension pole.

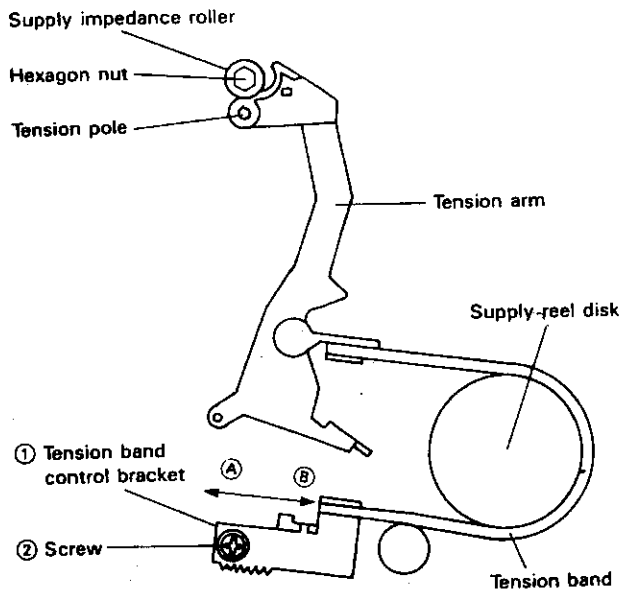


Figure 1-14.

4. At the top of the tape (E-180), check that the tension pole's center is aligned with the supply impedance roller's center.
5. Check that the tape is neither curled against the flange of the supply impedance roller nor mounted over it.
6. During the video search rewind mode with no cassette tape in place, check the supply reel disk is free of the tension band.

- **Position adjustment (Fig. 1-15)**

1. If the tension pole is at the right of the supply impedance roller's center, shift the tension band control bracket ① in the direction of arrow ⇒ Ⓑ , and tighten the screw ②.
2. If the tension pole is at the left of the supply impedance roller's center, shift the tension band control bracket ① in the direction of arrow ⇒ Ⓐ , and tighten the screw ② .

ADJUSTMENT OF RECORD/PLAYBACK BACK TENSION

- **Checking**

1. Remove the cassette housing assembly.
2. Put a torque cassette meter into the unit.
3. Push the record button to place the unit in the record mode. Check that the reading of the cassette meter is 23 to 28 g.cm.
4. Make sure the video cassette tape is wound over the retaining guide.
5. Make sure that the tape is not slack nor damaged at both ends.

- **Adjustment (Fig. 1-15)**

1. If the back tension is lower than specified, move the tension spring hook plate ① in the direction of arrow Ⓐ so that the protuberance behind be tight in the hole.
2. If the back tension is higher than specified, move the tension spring hook plate ① in the direction of arrow Ⓑ so that the protuberance behind be tight in the hole.

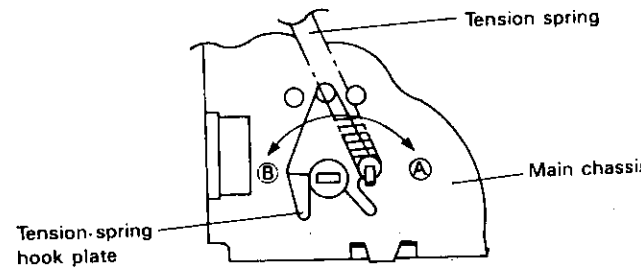


Figure 1-15.

Figure 1-16. Not used.

CHECKING THE BRAKE TORQUE

A) Checking the brake torque at the supply side.

- Checking

1. Remove the cassette housing assembly.
2. Check that the mechanism is in the stop mode.
   Note: The stop mode is brought about by unplugging the power cord with the mechanism in the fast forward or rewind mode.
3. Separate the idler gear from the supply reel disk and place the torque gauge on the supply reel disk.
4. Slowly rotate the torque gauge in the clockwise (CW) direction of the supply brake so that the reel disk and the gauge needle rotate at the same speed. Do the same in the counterclockwise (CCW) direction of the supply brake. Check that the values are within the specified range (CW direction = 280 to 720 g.cm, CCW direction = 110 to 230 g.cm) and that the brake torque in the CW direction is at least twice as high as that in the CCW direction.

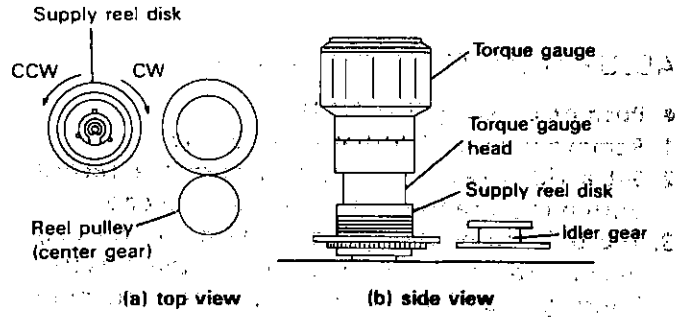


Figure 1-17.

- Adjustment

1. If the supply brake torque is outside the specified range (CW direction = 280 to 720 g.cm, CCW direction = 110 to 230 g.cm), clean the supply reel disk and brake lever felt, then recheck the torque.
2. If the supply brake torque is still outside the specified range, replace the main brake spring.

B) Checking the brake torque at the take-up side.

- Checking

1. Remove the cassette housing assembly.
2. Check that the mechanism is in the stop mode.
   Note: The stop mode is brought about by unplugging the power cord with the mechanism in the fast forward to rewind mode.
3. Separate the idler gear from the take-up reel disk and place the torque gauge on the take-up reel disk.

4. Slowly rotate the torque gauge in the CCW direction of the take-up brake so that the reel disk and the gauge needle rotate at the same speed. Do the same in the CW direction of the take-up brake. Check that the values are within the specified range (CCW direction = 280 to 720g.cm, CW direciton = 90 to 200 g.cm) and that the brake torque in the CCW direction is at least twice as high as that in the CW direction.

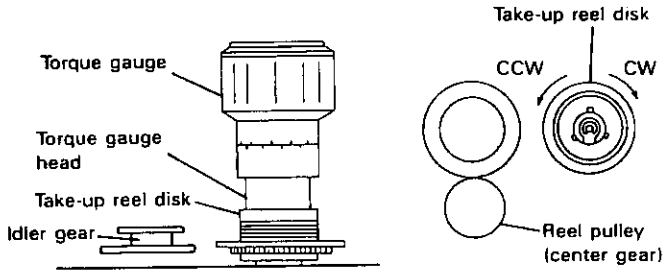


Figure 1-18.

- **Adjustment**

1. If the take-up brake torque is outside the specified range (CCW direction = 280 to 720g.cm, CW direction = 90 to 200 g.cm), clean the take-up reel disk and brake lever felt, then recheck the torque.
2. If the take-up brake torque is still outside the specified range, replace the main brake spring.

REPLACEMENT OF A/C (Audio/Control) HEAD

Note:

After replacement, perform the adjustment of tape drive train. Under any circumstances avoid touching the head (indicated by"⇒" in Fig. 1-20(c)).

•Replacement (See Figs. 1-19 and 1-20.)

1. Loosen the tilt adjusting screw ⑥ by using Phillips screwdriver.
2. Remove the azimuth adjusting screw ⑤ with a Phillips screwdriver.
3. Remove the A/C head screw ④ with a Phillips screwdriver, paying attention to the spring ⑦ between the A/C head screw ④ and A/C head pedestal.

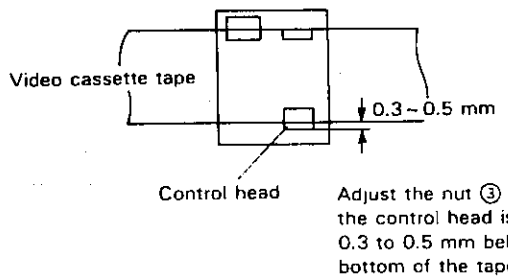

Video cassette tape
0.3~0.5 mm
Control head
Adjust the nut ③ so that the control head is visible 0.3 to 0.5 mm below the bottom of the tape.

Figure 1-19.

4. Remove the A/C head PWB ⑧ soldered to the A/C head assembly, and solder the A/C head PWB ⑧ onto a new A/C head assembly.
5. The A/C head assembly ① is attached so that the A/C head arm ② and A/C head pedestal are roughly parallel to each other.

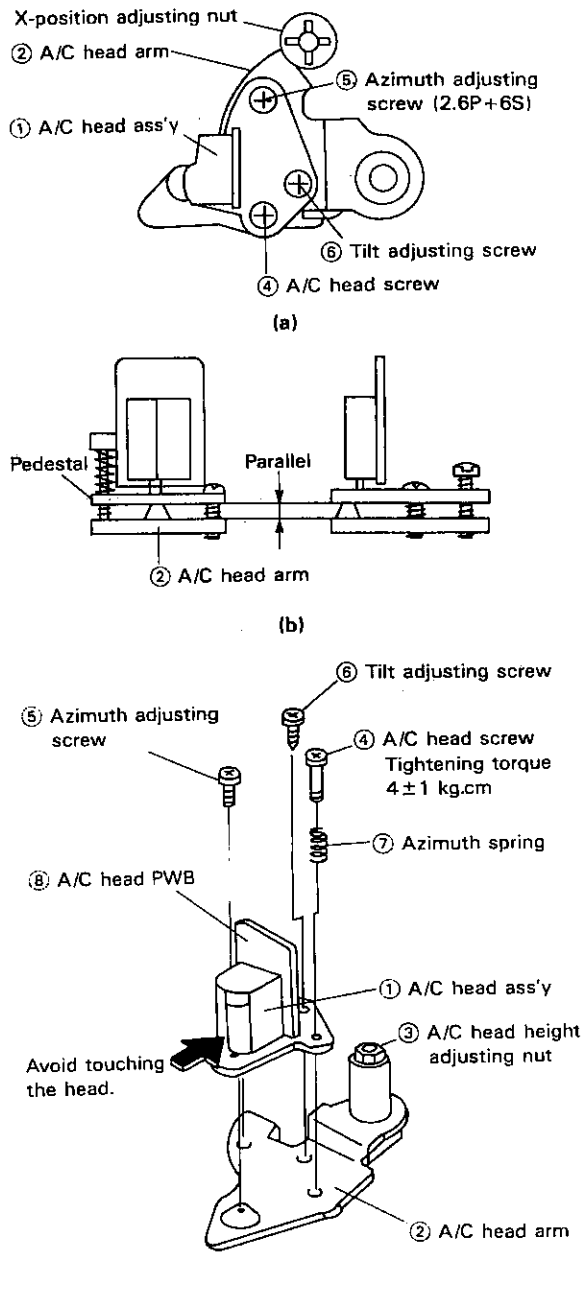


Figure 1-20.

6. Set the A/C head tilt angle according to Fig. 1-22.
7. Play an alignment tape and roughly adjust the height of the A/C head, visually, by turning the A/C head adjusting hexagon nut ③ with the box driver (JiGDRiVER110-7) until the tape comes to the position shown below. (See Fig. 1-19.)
8. Set the mechanism to the loading mode. Place the A/C head tilt adjusting jig on the main chassis as shown in Fig. 1-21. Slowly turn the tilt abjusting screw ⑥ with a Phillips screwdriver until there is no gap between the jig and the A/C head.

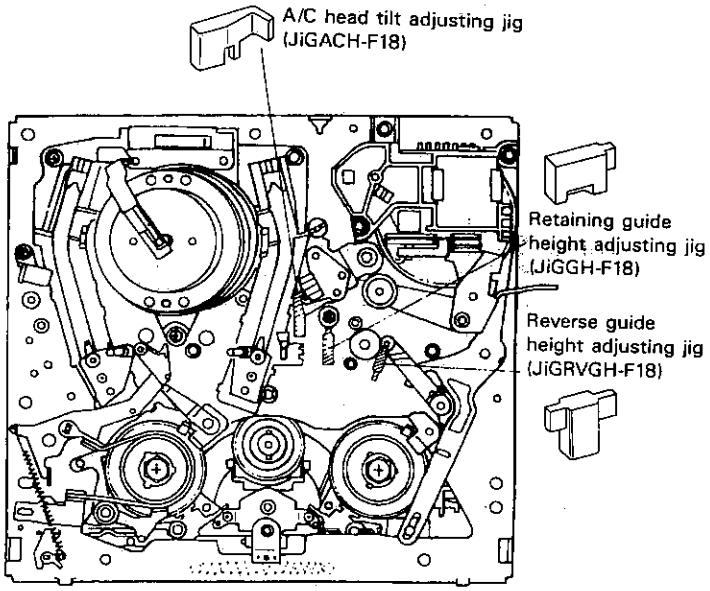


Figure 1-21.

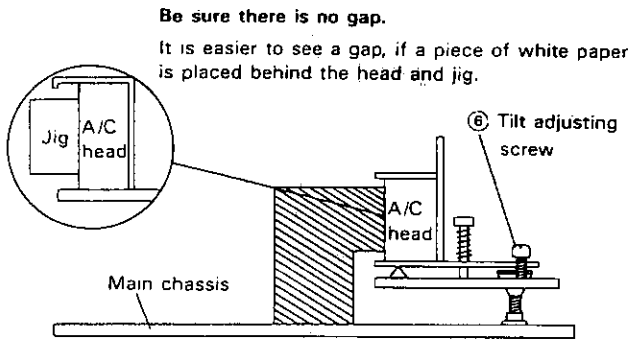

Be sure there is no gap.
It is easier to see a gap, if a piece of white paper is placed behind the head and jig.
Jig
A/C head
⑥ Tilt adjusting screw
A/C head
Main chassis

Figure 1-22.

HEIGHT ADJUSTMENT OF RETAINING GUIDE AND REVERSE GUIDE

- Adjustment

1. Before the rough adjustment of tape drive train, check that the retaining guide and reverse guide heights are within the specified values of Fig. 1-23, by using the special jigs.
2. If the retaining guide height is not correct, adjust the height with the box driver (JiGDRiVER110-4).
3. If the reverse guide height is not correct, use the height adjusting washers.

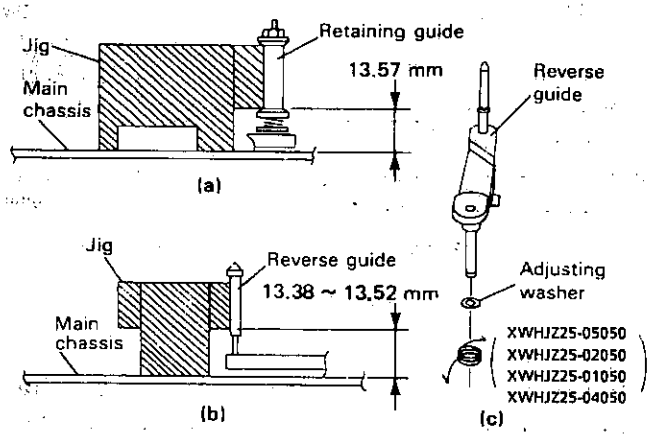


Figure 1-23.

ADJUSTMENT OF TAPE DRIVE TRAIN

1. Check and adjust the position of the tension pole and the back tension.(See pages 15)
2. Set the tilt angle of the A/C head as shown in Fig. 1-22.
   Note:
   If the A/C head is adjusted, check and set the tilt angle as in the case of replacement.
3. When the above adjustments have been completed, roughly adjust the tape drive train using an alignment tape.
   a. Connect the oscilloscope to the test points for PB chroma output (TP501) and head switching pulse (TP502). Allow the PB CHROMA signal to be triggered by the head switching pulse of TP502.
   b. Loosen the setscrew of the guide roller, and tighten it loosely by using the special bladed screwdriver (JiGDRiVERH-4) to such an extent that the guide roller turns smoothly.
   c. Set the alignment tape (VROCPSV) on the reel disk.
      Note:
      Attach a 400 to 500g.weight to the cassette tape when a cassette tape is placed on the reel disk with the cassette housing assembly removed.

d. Place the unit to the playback mode.
e. Observe the waveform of the PB chroma, and push the (+)or(-) tracking button to check for a flat PB chroma. This adjustment is satisfactory if a flat response is obtained on the waveform of the PB chroma when the (+)or(-) tracking button is pushed. If a flat response cannot be obtained roughly adjust the guide roller using the special bladed screwdriver until the PB chroma output is flat.
While keeping the both(+)and(-) tracking buttons down, adjust the X-position adjusting nut so that the PB CHROMA envelope becomes almost maximum. In the case of rough adjustment, pay particular attention to the outlet side (see Fig. 1-24).
f. Adjust the retaining guide height so that the lower flange of the retaining guide touches the bottom edge of the tape. At that time, check that the tape is not curled nor wrinkled.

4. The A/C head height and azimuth are adjusted after rough adjustment of the tape drive train has been done.
a. Use the alignment tape and play back its audio 7kHz signal (monoscope pattern for video signal)and observe the audio output on an oscilloscope.
b. Adjust the azimuth adjusting screw so as to obtain the maximum audio output.
c. Use the alignment tape and play back its audio 1kHz signal (colour bar for video signal) and slowly rotate the A/C head height adjusting nut with the special box driver so as to obtain the maximum audio output.
d. After the height adjustment, use the alignment tape and play back its audio 7kHz signal (monoscope pattern for video signal) again and adjust the azimuth adjusting screw so as to obtain the maximun audio output.
After this adjustment, apply glyptal to the screws and nuts to fix them.

5. The final adjustments of tape drive train and X-position are adjusted after adjustment of the A/C head has been completed.
a. Connect the oscilloscope to the test points for PB chroma output (TP501) and head switching pulse (TP502). Allow the PB CHROMA signal to be triggered by the head switching pulse of TP502.
b. Play back the tape drive train alignment tape (VROCPSV).
c. Finely adjust the guide rolle's height, observing the envelope on the oscilloscope.
Push the (+) or (-) tracking button while adjusting the guide roller, in order to obtain an envelope waveform which is as flat as possible. If the tape is above or below the helical lead, the PB chroma waveform will take the shape shown in Fig. 1-26.
Adjust for maximum flatness of the envelope according to the figure.
Note:
Adjustment is made for CH-1 of switching pulse (low level). The broken lines indicate the envelope waveform when the tape does not run properly.
Push the (+) or (-) tracking button to check the envelope waveform.
After adjustment, tighten the setscrew of the guide roller firmly.
Play back the alignment tape (VROCPSV) again in the unloading mode, and make sure that there is on change in the PB chroma output.

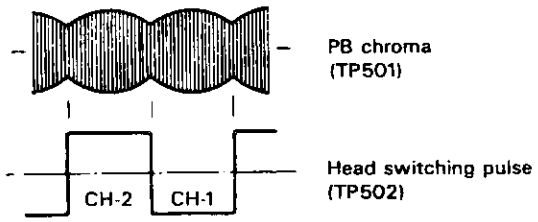


Figure 1-24.

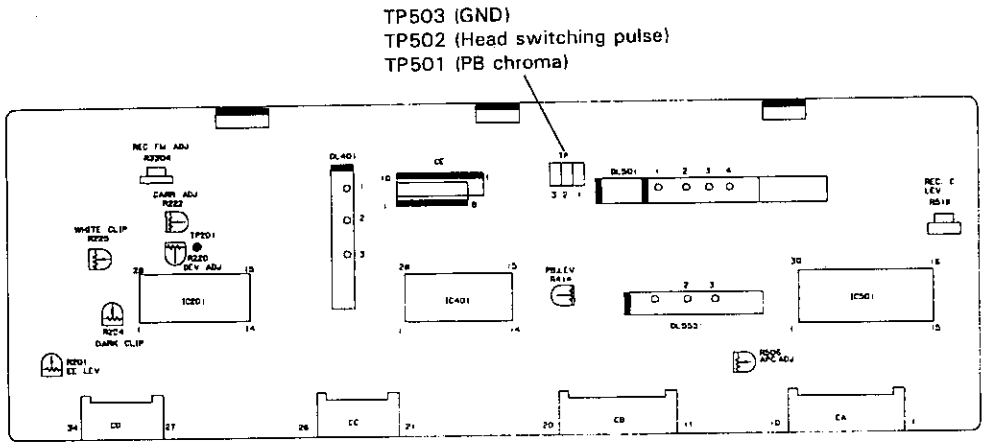


Figure 1-25.

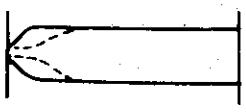
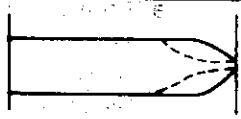
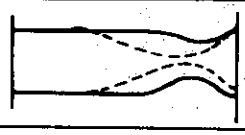
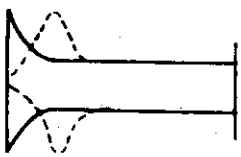
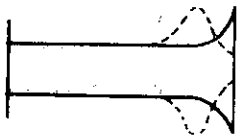
	When the tape is above the helical lead.		When the tape is below the helical lead.	
	Supply side	Take-up side	Supply side	Take-up side
				
				
Adjustment	Supply side guide roller rotated in clockwise direction (lowers guide roller) to flatten envelope.	Take-up side guide roller rotated in clockwise direction (lowers guide roller) to flatten envelope.	Supply side guide roller rotated in counterclokwise direction (raises guide roller) to have the tape float above the helical lead. The supply side guide roller is then rotated in the clockwise direction to flatten the envelope.	Take-up side guide roller rotated in counterclockwise direction (raises guide roller) to have the tape float above the helical lead. The take-up side guide roller is then rotated in the clockwise direction to flatten the envelope.

Figure 1-26.

d. Adjust the retaining guide height so that the lower flange of the retaining guide touches the bottom edge of the tape. At that time, check that the tape is not curled nor wrinkled.
e. The X-position is adjusted after tape drive train adjustment.
Push the (+) and (-) tracking buttons at the same time to set the tracking buttons to the preset mode, and rotate the X-position adjusting nut shown in Fig. 1-27 with the special bladed screwdriver for maximum switching pulse low side envelope, and then adjust the A/C head position. Now adjust the play back switching point to 6.5 ±0.5H.
Check the flatness of envelope and sound by selfrecording.

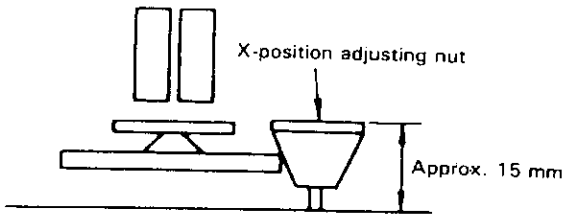
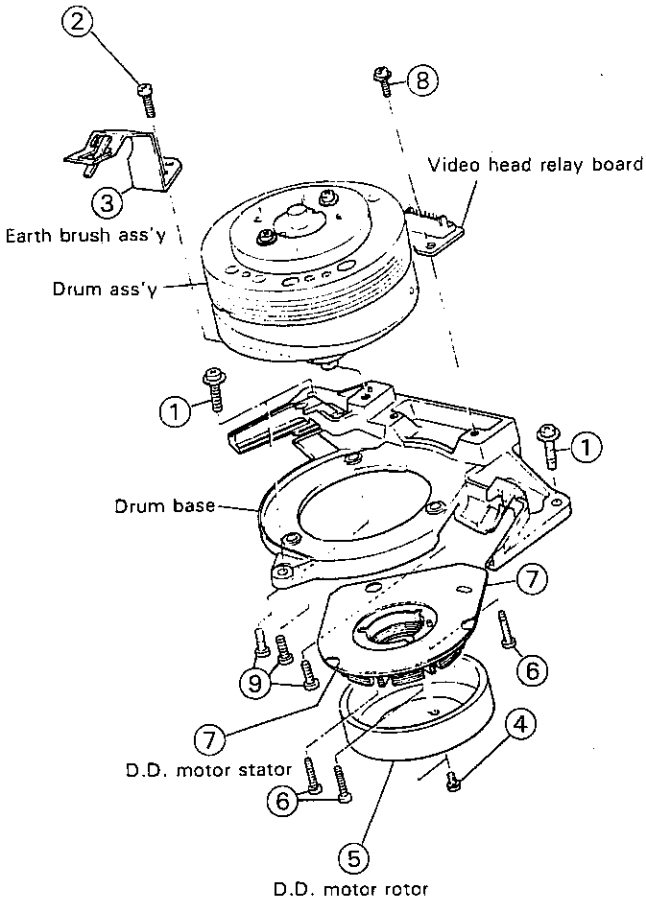


Figure 1-27.

REPLACEMENT OF DRUM ASSEMBLY

- Removal

1. Remove the head amp. PWB from the video head relay board.
2. Remove the bottom board (Ref. No ④ in the Cabinet Parts Diagram).
3. Remove the D.D. drum motor connector (ME).
4. Loosen the Drum-base mounting screws ① and remove the drum ass'y from the mechanism chassis.
5. Loosen the Earth brush ass'y mounting screw ② and remove the Earth brush ass'y ③.
6. Loosen the two D.D. motor rotor mounting screws ④ and remove the D.D. motor rotor ⑤.
7. Loosen the three D.D. motor stator mounting screws ⑥ and remove the stator ⑦.
8. Remove the two video head relay board mounting screws ⑧
9. Loosen the three drum ass'y mounting screws ⑨ and remove the drum ass'y from the Drum-base.



Note:
Secure the D.D. rotor assembly so that the installation positioning holes in the D.D. rotor assembly and lower drum match.

Figure 1-28.

REPLACEMENT OF D.D. (DIRECT DRIVE) MOTOR

Note:
Put the unit in the cassette eject position.

- **Removal**

1. Remove the six screws from the bottom panel and remove the bottom panel.
2. Disconnect the drum D.D. motor lead connector.
3. Remove the two screws① which hold the D.D. rotor assembly in place, using a Phillips screwdriver.
4. Remove the D.D. rotor assembly.
5. Remove the three screws ② which hold the D.D. stator assembly in place, using a Phillips screwdriver.
6. Remove the D.D. stator assembly.

- **Reassembly**

1. Place the D.D. stator assembly on top of the lower drum.
2. Secure the D.D. stator with the three screws ② using a Phillips screwdriver.

Note:
Be careful not to scratch the core, windings or Hall device.

3. Install the D.D. rotor assembly onto the drum shaft.

Note:
Install the assembly directly onto the direction of the shaft. (Refer to Fig. 1-29 for the installation direction.)

4. Secure the D.D. rotor assembly with the screws ①.
5. Connect the drum D.D. motor lead connector.
6. Install the bottom panel with six screws.

Note:
Be careful not to damage the upper drum or the video head.

7. After replacement of the D.D. motor as shown above, proceed with the adjustment of the playback switching point.

Notes:
1. Be careful not to damage the upper drum or the video head.
2. Be sure that the Hall device and the D.D. stator assembly are not damaged by the D.D. rotor assembly or other parts.

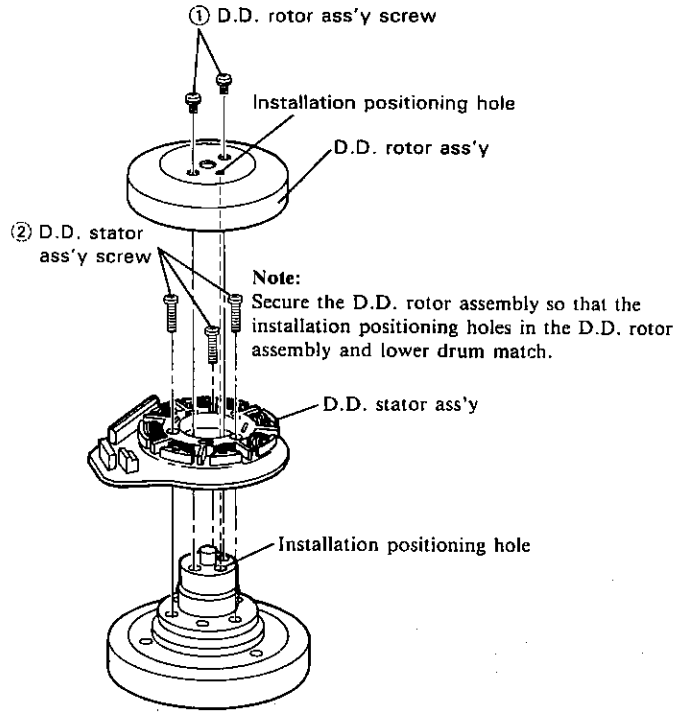

① D.D. rotor ass'y screw
Installation positioning hole
D.D. rotor ass'y
② D.D. stator ass'y screw
Note:
Secure the D.D. rotor assembly so that the installation positioning holes in the D.D. rotor assembly and lower drum match.
D.D. stator ass'y
Installation positioning hole

Figure 1-29.

REPLACEMENT OF THE CAPSTAN D.D. (DIRECT DRIVE) MOTOR

- **Removal**

1. Remove the FFC ① from the capstan D.D. motor control PWB ②.
2. Remove the three screws ③, and remove the capstan D.D. motor ④ from the main chassis.

- **Reassembly**

1. Mount the capstan motor on the main chassis while making sure not to allow the capstan shaft to hit the main chassis, and attach it with the three screws ③.
2. Insert the FFC ① into the capstan D.D. motor control PWB ②.

Notes:

1. After installing the capstan D.D. motor, be sure to rotate the capstan motor and check the movement.
2. Check and adjust the servo circuit.

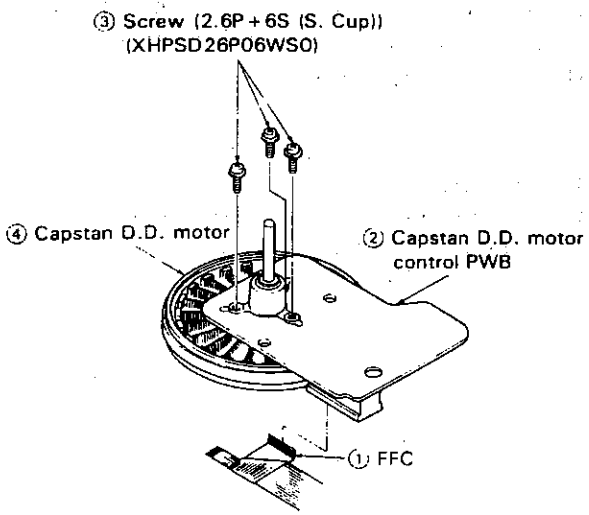


Figure 1-30.

REMOVAL AND REASSEMBLY OF THE LOADING GEAR BLOCK

- **Removal**

1. Remove the slow brake spring ①, slow brake lever ② and slow brake cap ⑪.
2. Take out the E ring Ⓐ first and then the loading relay gear ③.
3. Rotate the take-up loading gear ④, take-up loading arm assembly ⑤, supply loading gear ⑥ and supply loading arm assembly ⑦ slightly in the loading direction, and take them all out.
4. Finally remove the E ring Ⓑ and relay gear drive lever ⑧.

- **Reassembly**

1. Take the reverse steps of the removal.
2. In reassembling, match the tally marks on the gears, as shown in Fig. 1-31

Note:

1. When reassembling, apply grease to the following points; all the gear teeth, all the gear shafts, and the cam groove of loading relay gear which the relay gear drive lever pin comes in.
2. Be careful not to deform the supply/take-up loading arms.
3. Be careful not to stain the felt of the slow brake.
4. Be also careful to keep the outer surface of the capstan D.D. motor ⑨ free from dust and dirt. (If stained, the MR (Magnet Resistor) element ⑩ might be damaged.)
5. Reshape the anti-fall hooks of the slow brake, supply/take-up loading gears as required. Avoid reshaping too much. Do not forget to place the slow brake cap in position.

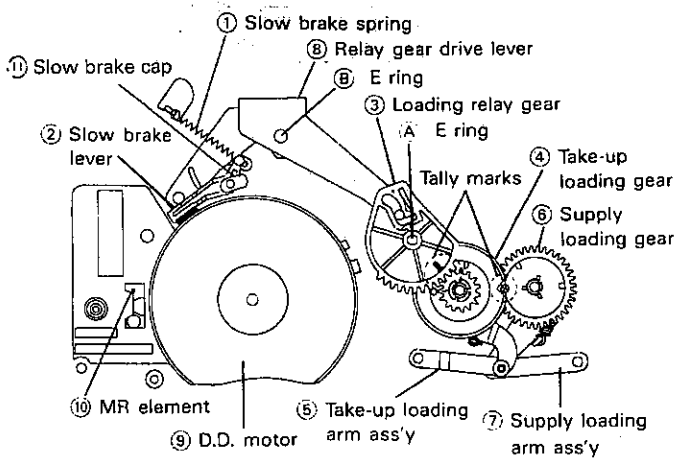


Figure 1-31.

REMOVAL AND REASSEMBLY OF LOADING BLOCK

- **Removal**

1. Remove the leads and the cassette loading belt from the loading block.
2. Unscrew the three screws ③, and pull up and remove the loading block.

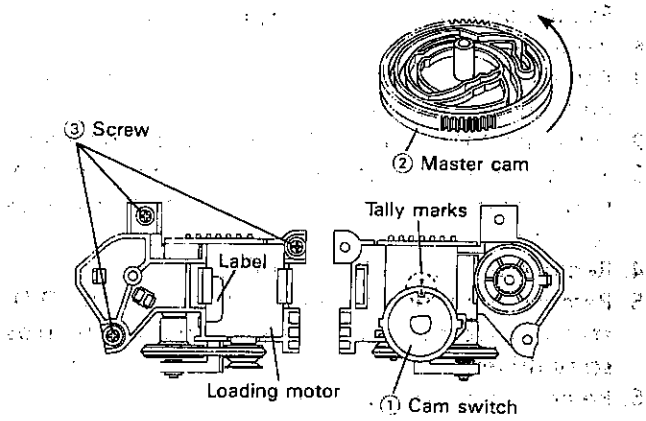


Figure 1-32.

- **Reassembly**

1. Turn the master cam ② all the way counter-clockwise.
2. Match the tally mark on the cam switch ① with the mating mark. Fit the loading block and the master cam with each other. Tighten up the three screws.
3. Finally connect the leads and apply the cassette loading belt.

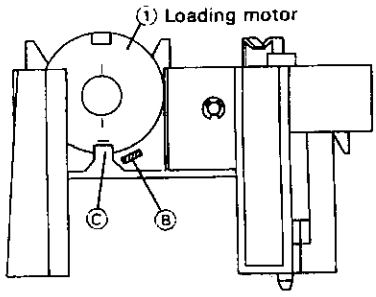
Notes:

1. Be careful not to scratch the gear.
2. Be careful not to stain the belt. If dirty, clean it up.

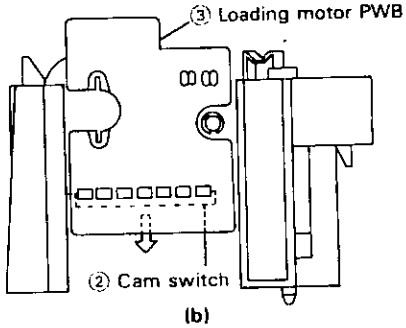
REPLACEMENT OF LOADING MOTOR

- **Removal**

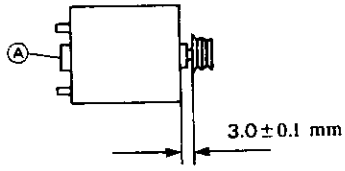
1. Remove the loading block.
2. Undo the loading belt.
3. Unsolder the leads from the loading motor ①.
4. Unlock the left and right catches of the cam switch ② off the loading block. Take out the loading block PWB ③.



(a)



(b)



(c)

Note:

1. Press-fit the loading motor pulley to the dimension specified in Fig. 1-33(c).
2. Keep the pressure on the part Ⓐ (see above) less than 5 kg.

Figure 1-33.

5. Put the tip of a bladed screwdriver or the like into the opening Ⓑ shown in Fig. 1-33 (a). Pry up the back end of the loading motor ① and take out the motor.

- **Reassembly**

1. Place the loading motor so that its label is visible as ahown in Fig. 1-32.
   Note:
   Make sure that the screw hole at the motor shaft and the protuberance on the loading block are properly engaged and that the notch at the loading motor end and the part Ⓒ of the loading block are also fitted together.
2. Set up the loading block PWB ③ and the cam switch ② in position.
3. Resolder the leads to the loading motor.
4. Finally place the loading block in position.

REPLACEMENT OF MASTER CAM

- **Removal**

1. Remove the loading block.
2. Remove the E ring Ⓐ and then the half-loading reciprocating lever ①.
   Note:
   There is no need to take out the half-loading drive lever.
3. Remove the E ring Ⓑ first and then the pinch roller lever ②.
4. Finally pull out the master cam ③ upward.

- **Reassembly**

1. Place the relay gear drive lever in the unloading state as shown in Fig. 1-31.
2. Set the relay shifter lever ④ to the main chassis; the shifter lever should be adjusted to the reverse guide spring hole in the main chassis. Then place the master cam so that the cut-off part of the boss Ⓒ should face the direction of arrow ⇒ Ⓔ.
3. Place the half-loading reciprocating lever ① so that its cam follower comes in the outermost cam groove. Now attach the E ring Ⓐ.
   Note:
   Preferably hook the half-loading reciprocating spring ⑤ before attaching the lever. It is easier to set up.
4. Turn the master cam ③ somewhat clockwise until the pinch roller lever's cam follower comes into the master cam's groove Ⓓ. Then attach the E ring Ⓑ.
5. Rotate the master cam ③ by hand to make sure all the four levers (relay gear drive lever, relay shifter lever, half-loading reciprocating lever and pinch roller lever) are right in the cam grooves.
6. Finally set up the loading block.

Notes:

1. **Be careful not to scratch the teeth and grooves of the master cam.**
2. **Before placing the loading block, be sure to rotate the master cam by hand to make sure the levers are right in their respective positions. Otherwise the master cam and the levers might get damaged when the motor starts.**
3. **Apply grease to the master cam's grooves and teeth.**

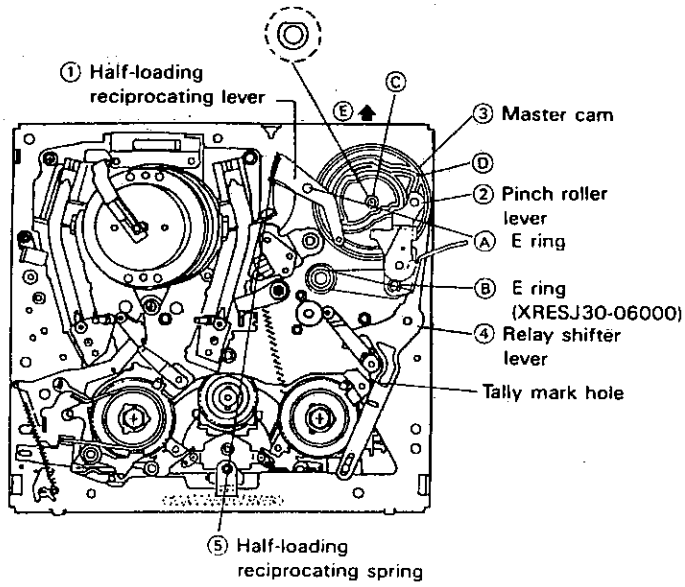


Figure 1-34.

HOW TO UNLOAD THE CASSETTE MANUALLY

1. To unload the cassette the common way.

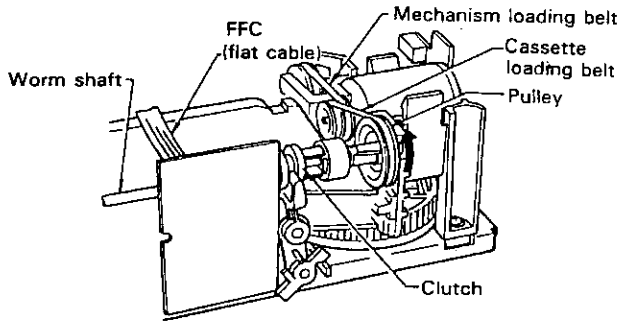


Figure 1-35.

(1) Turn the pulley in the direction of arrow. (By this, the clutch becomes engaged to eject the cassette.)

Notes:

- Do not touch the worm shaft. Just turn the pulley, and the worm shaft will rotate together.
- Carefully turn the pulley if the unit is equipped with the half-loading lever. Otherwise the cassette tape may get loose.

(2) To unload the cassette by activating the cassette housing control.

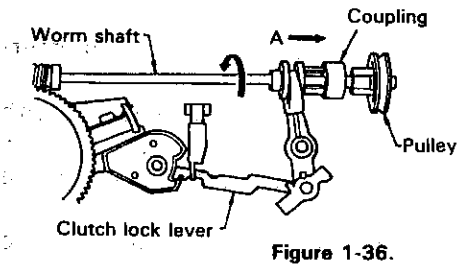


Figure 1-36.

(1) Remove the cassette loading belt.
(2) Turn the coupling in the direction of arrow until the cassette comes up.
(3) Press the clutch in the direction A to get the clutch engaged.
(4) Now turn the worm shaft all the way in the direction of arrow to take out the cassette.

Notes:

- Carefully turn the worm shaft if the unit is equipped with the half-loading lever. Otherwise the cassette tape may become loose.
- If the second method (activating the cassette housing control) is carried out, the cassette housing control and the mechanism come out of phase from each other. Take the following steps to get in phase with the cassette housing control.

(1) Remove the cassette loading belt and the flat cable.
(2) Turn the power on. The mechanism will automatically be in the eject mode and get in phase with the cassette housing control.
(3) Unplug the power cord.
(4) Make sure the cassette housing stays in the eject mode. Apply the cassette loading belt and connect the flat cable.
(5) Plug in the power cord. Finally load the cassette and eject it to make sure the motion is perfect. (This loading and ejection makes for proper phasing.)

- If the tape has not been fully rewound, remove the bottom panel of the unit and turn the capstan D.D. motor rotor or the reel pulley in the direction of arrow B to wind up the tape. Now you can take out the cassette without damaging the tape.
- Before taking the above measure, be sure to unplug the power cord.

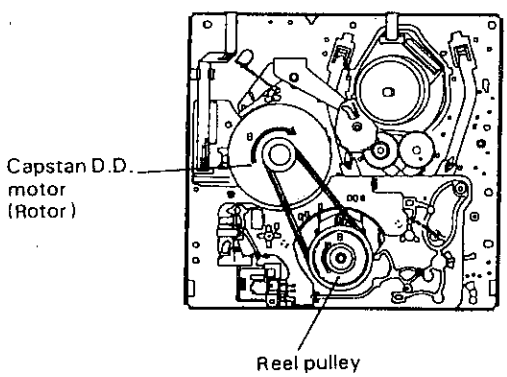


Figure 1-37.

ADJUSTMENT OF ELECTRICAL CIRCUITRY

Prior to the adjustment:
In most cases, necessity for electrical circuits will arise from replacement of mechanical parts including the video head. Before starting adjustment of electrical circuits, check that mechanical operation of the equipment is complete (the mechanism are adjusted completely).

If the equipment fails electrically, locate a defect or defects first of all using instruments. Then repair or replace parts and make adjustment by the procedures described below.
When required instrumetns are not available, do not move controls indiscriminately.

- Instruments
  - Colour monitor TV
  - DC regulated power supply
  - VTVM
  - Oscilloscope
  - Audio generator
  - Colour bar generator
  - Alignment tape
  - Frequency counter
  - Blank video tape(VHS)

ADJUSTMENT OF MAIN (SERVO, SYSTEM CONTROL) CIRCUIT

- Test points layout

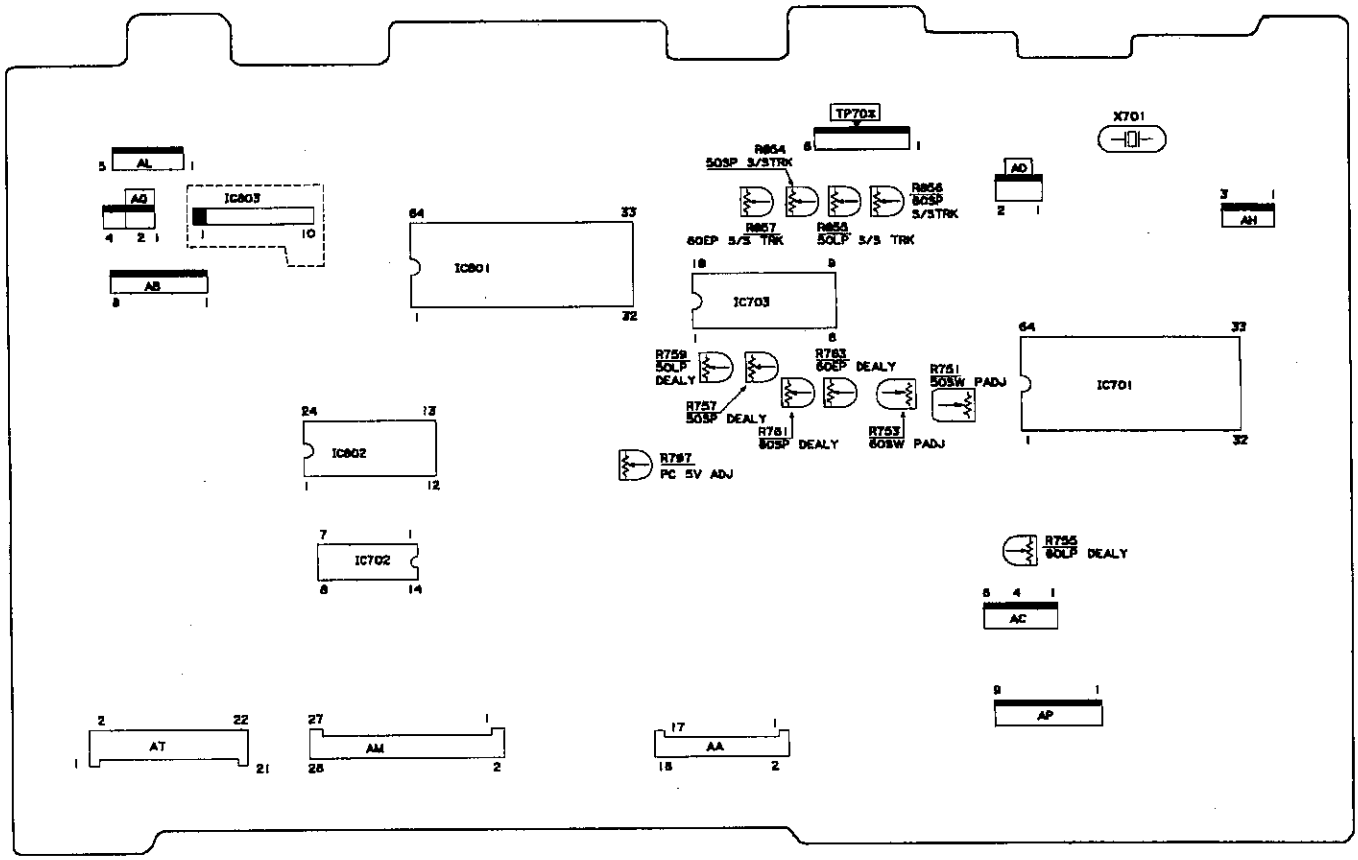


Figure 2-1. System Control, Servo PWB

ADJUSTMENT OF SERVO CIRCUIT

Adjustment of PC 5V power supply

Measuring instrument	VTVM
Mode	PAL System SP Recording
Test point	TP704
Adjusting point	R797 (PC 5V control)
Specification	5.1 ± 0.1V

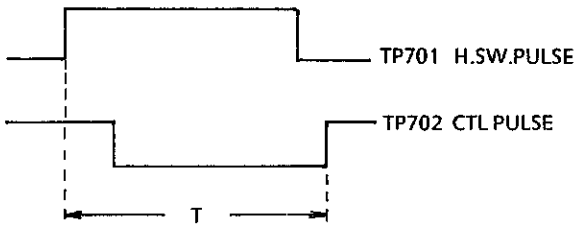
In the PAL System SP Recording mode, adjust R797 so that the voltage at TP704 be 5.1 ± 0.1V.

Precaution in adjusting the X position

Adjustment of PAL System SP Delay

Measuring instrument	Oscilloscope
Mode	PAL SP Recording
Tape used	Blank tape
Test point	CH1:TP701 H.SW.PULSE CH2:TP702 CTL PULSE
Adjusting point	R757 PAL SP Delay
Specification	T = 30.2 ± 1 msec.

1. Insert the blank tape and put the unit in the PAL SP Recording mode.
2. Make sure that the time "T" from the leading edge of head switching pulse to the leading edge of control pulse at TP702 (CTL PULSE) is 30.2 ± 1 msec.



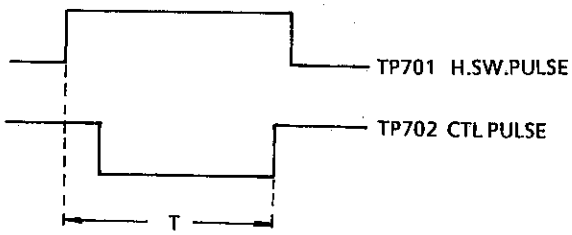
T = 30.2 ± 1 msec.

Figure 2-2.

Adjustment of PAL System LP Delay

Measuring instrument	Oscilloscope
Mode	PAL LP Recording
Tape used	Blank tape
Test point	CH1:TP701 H.SW.PULSE CH2:TP702 CTL PULSE
Adjusting point	R759 PAL LP Delay
Specification	T = 18.4 ± 1 msec.

1. Insert the blank tape and put the unit in the PAL LP Recording mode.
2. Make sure that the time "T" from the leading edge of head switching pulse to the leading edge of control pulse at TP702 (CTL PULSE) is 18.4 ± 1 msec.



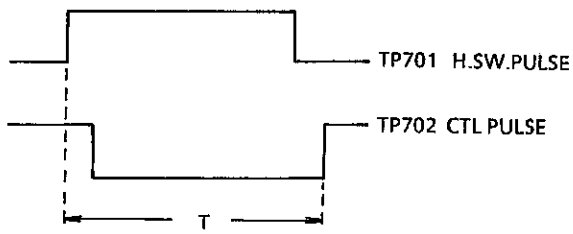
T = 18.4 ± 1 msec.

Figure 2-3.

Adjustment of NTSC System SP Delay

Measuring instrument	Oscilloscope
Mode	NTSC SP Recording
Tape used	Blank tape
Test point	CH1:TP701 H.SW.PULSE CH2:TP702 CTL PULSE
Adjusting point	R761 NTSC SP Delay
Specification	T = 24.0 ± 1 msec.

1. Insert the blank tape and put the unit in the NTSC SP Recording mode.
2. Make sure that the time "T" from the leading edge of head switching pulse to the leading edge of control pulse at TP702 (CTL PULSE) is 24.0 ± 1 msec.



T = 24.0 ± 1 msec.

Figure 2-4.

Adjustment of NTSC System LP Delay

Measuring instrument	Oscilloscope
Mode	NTSC LP Recording
Tape used	Blank tape
Test point	CH1:TP701 H.SW.PULSE CH2:TP702 CTL PULSE
Adjusting point	R755 NTSC LP Delay
Specification	T = 11.2 ± 1 msec.

1. Insert the blank tape and put the unit in the NTSC LP Recording mode.
2. Make sure that the time "T" from the leading edge of head switching pulse to the leading edge of control pulse at TP702 (CTL PULSE) is 11.2 ± 1 msec.

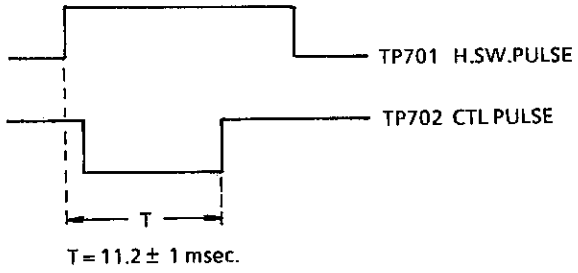


Figure 2-5.

Adjustment of NTSC System EP Delay

Measuring instrument	Oscilloscope
Mode	NTSC EP Recording
Tape used	Blank tape
Test point	CH1:TP701 H.SW.PULSE CH2:TP702 CTL PULSE
Adjusting point	R763 NTSC EP Delay
Specification	T = 16.7 ± 1 msec.

1. Insert the blank tape and put the unit in the NTSC EP Recording mode.
2. Make sure that the time "T" from the leading edge of head switching pulse to the leading edge of control pulse at TP702 (CTL PULSE) is 16.7 ± 1 msec.

   Now go to the X position adjustment.

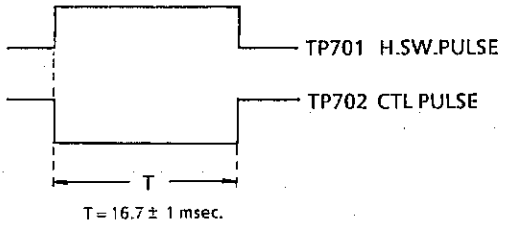


Figure 2-6.

Adjustment of PAL System playback switching point

Measuring instrument	Oscilloscope
Mode	Playback Tracking button at center
Tape used	Alignment tape (VROCPSV)
Test point	CH-1; TP701 CH-2; Video output terminal (CH-1 trigger slope switch at (+), Internal trigger at CH-1 side)
Adjusting point	R751 (PAL switching point control)
Specification	6.5 ± 0.5H

1. Insert the PAL System alignment tape (VROCPSV) and put the unit in the playback mode.
2. Set the tracking button to the center position.
3. Adjust R751 (PAL switching point control) so that the waveform on the oscilloscope screen be as shown in Fig. 2-7.

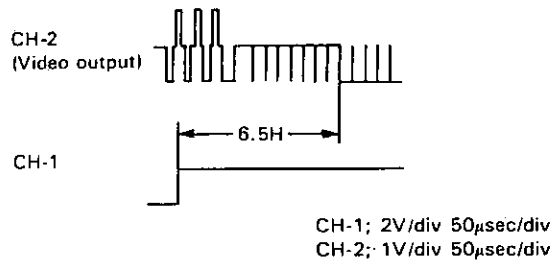
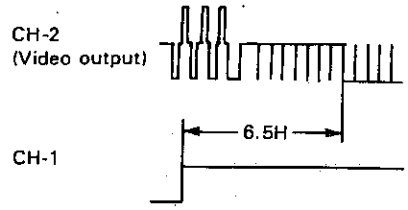


Figure 2-7.

Adjustment of NTSC System playback switching point

Measuring instrument	Oscilloscope
Mode	Playback Tracking button at center
Tape used	Alignment tape (VROATSV)
Test point	CH-1; TP701 CH-2; Video output terminal (CH-1 trigger slope switch at (+), Internal trigger at CH-1 side)
Adjusting point	R753 (NTSC switching point control)
Specification	6.5 ± 0.5H

1. Insert the NTSC System alignment tape (VROATSV) and put the unit in the playback mode.
2. Set the tracking button to the center position.
3. Adjust R753 (NTSC switching point control) so that the waveform on the oscilloscope screen be as shown in Fig. 2-8.



CH-1; 2V/div 50μsec/div
CH-2; 1V/div 50μsec/div

Figure 2-8.

Adjustment of PAL System SP slow tracking

Measuring instrument	Monitor TV
Mode	Recording and playback on self-recording tape.
Input signal	Commercial broadcast or video signal (external input selector switch)
Test point	Monitor screen
Adjusting point	R854 (PAL SP slow tracking control)
Specification	No noise bar on the monitor TV screen

1. Receive a commercial broadcast signal, or feed the video signal to the video input terminal (with the external input selector switch).
2. Make recording and playback on the self-recording tape.
3. Press the slow button and play back the recorded portion in the slow mode.
4. Set the tracking button to the center position.
5. Observing the monitor screen, adjust the PAL SP slow tracking preset control (R854) until the noise bar disappears form the screen.
6. Press the playback button to play back the tape. Then push the pause/still button to reproduce the recording in the still mode. Now make sure there is no noise on the screen. (Repeat this step three times or so.)

Adjustment of NTSC System SP slow tracking

Measuring instrument	Monitor TV
Mode	Recording and playback on self-recording tape.
Input signal	Video signal (external input selector switch)
Test point	Monitor screen
Adjusting point	R856 (NTSC SP slow tracking control)
Specification	No noise bar on the monitor TV screen

1. Feed the video signal to the video input terminal (with the external input selector switch).
2. Make recording and playback on the self-recording tape.
3. Press the slow button and play back the recorded portion in the slow mode.
4. Set the tracking button to the center position.
5. Observing the monitor screen, adjust the NTSC SP slow tracking preset control (R856) unit the noise bar disappears form the screen.
6. Press the playback button to play back the tape. Then push the pause/still button to reproduce the recording in the still mode. Now make sure there is no noise on the screen. (Repeat this step three times or so.)

Adjustment of PAL System LP slow tracking

Measuring instrument	Monitor TV
Mode	Recording and playback on self-recording tape.
Input signal	Commercial broadcast or video signal (external input selector switch)
Test point	Monitor screen
Adjusting point	R855 (PAL LP slow tracking control)
Specification	No noise bar on the monitor TV screen

1. Receive a commercial broadcast signal, or Feed the video signal to the video input terminal (with the external input selector switch).
2. Make recording and playback on the self-recording tape.
3. Press the slow button and play back the recorded portion in the slow mode.

4. Set the tracking button to the center position.
5. Observing the monitor screen, adjust the PAL LP slow tracking preset control (R855) until the noise bar disappears form the screen.
6. Press the playback button to play back the tape. Then push the pause/still button to reproduce the recording in the still mode. Now make sure there is no noise on the screen. (Repeat this step three times or so.)

Adjustment of NTSC System EP Slow tracking

Measuring instrument	Monitor TV
Mode	Recording and playback on self-recording tape.
Input signal	Video signal (external input selector switch)
Test point	Monitor screen
Adjusting point	R857 (NTSC EP slow tracking control)
Specification	No noise bar on the monitor TV screen

1. Feed the video signal to the video input terminal (with the external input selector switch).
2. Make recording and playback on the self-recording tape.
3. Press the slow button and play back the recorded portion in the slow mode.
4. Set the tracking button to the center position.
5. Observing the monitor screen, adjust the NTSC EP slow tracking preset control (R857) until the noise bar disappears form the screen.
6. Press the playback button to play back the tape. Then push the pause/still button to reproduce the recording in the still mode. Now make sure there is no noise on the screen. (Repeat this step three times or so.)

Adjustment of still picture vertical sync (Performance check)

Measuring instrument	Monitor TV
Mode	Still picture playback
Tape used	Self-recording tape
Test point	Monitor screen
Adjusting point	R8110 (V-Lock control)
Specification	No vertical jitter

1. Play back the tape self-recorded in the LP mode.
2. Press the pause/still button to reproduce the recording in the still mode.
3. Observing the monitor screen, adjust the still picture V-Lock control (R8110) until the vertical jitter disappears from the screen.

Note; V-Lock control (R8110) is located in the operation PWB.

ADJUSTMENT OF MAIN, SUB CHROMA AND HEAD AMP CIRCUIT

● Test point layout

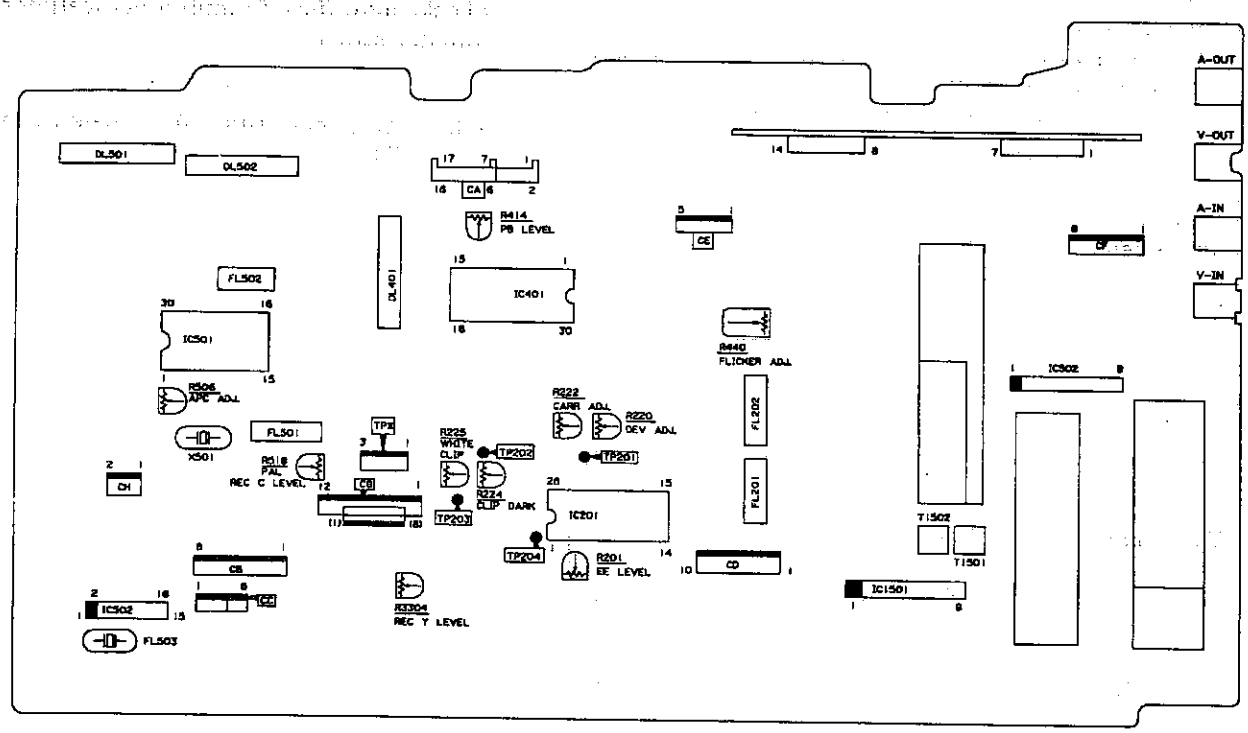


Figure 2-9. MAIN PWB

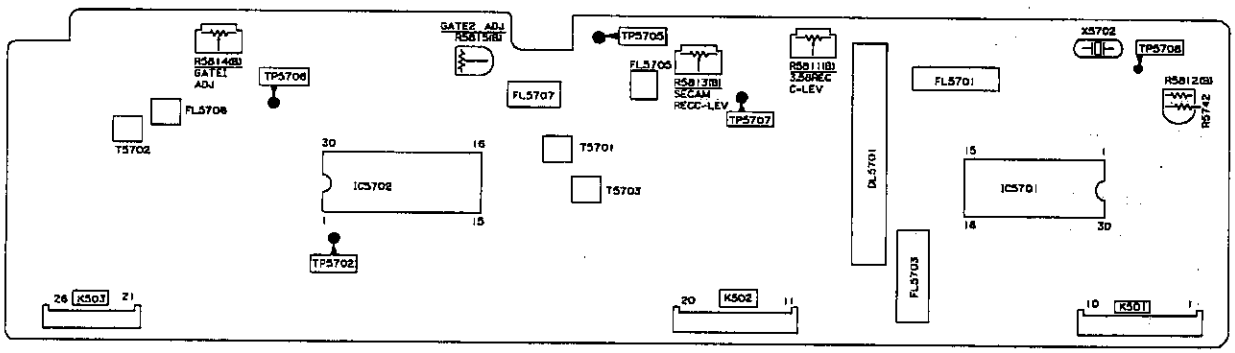


Figure 2-10. SUB CHROMA PWB

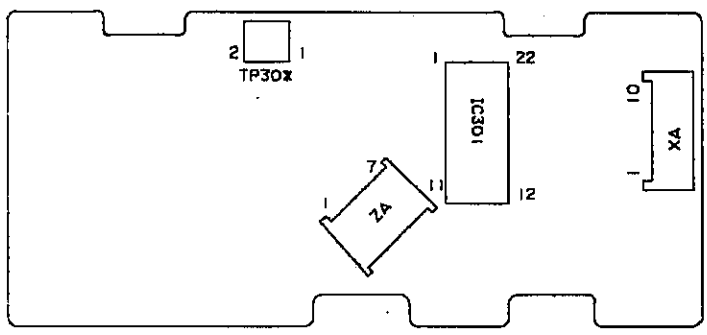


Figure 2-11. HEAD.AMP PWB

■ ADJUSTMENT OF Y/C RECORDING CIRCUIT

Adjustment of EE level

Measuring instrument	Oscilloscope
Mode	Recording
Input signal	Standard colour bar (stair-case waveform)
Test point	Video output terminal
Adjusting point	R201 (EE level control)
Specification	1.0 ± 0.05 Vp-p

Note:
The video output terminal should be terminated with a 75-ohm impedance.

1. Set the unit to the record mode.
2. Feed the colour bar signal (stair-case waveform) to the video input terminal. Observing the voltage across the terminal resistor of the video output terminal on the oscilloscope screen, adjust R201 (EE level control) to obtain the value indicated in Fig. 2-12.

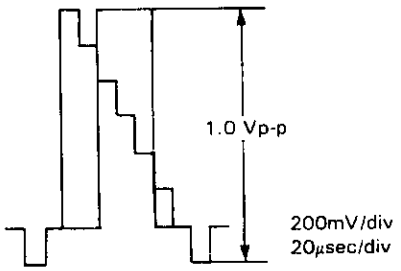


Figure 2-12.

Ajustment of FM 3.8 MHz and 4.8 MHz

Measuring instrument	Frequency counter	Oscilloscope
Mode	Recording	Self-recording / playback
Input signal	External input (no signal)	Standard colour bar (stair-case waveform)
Test point	TP203 (Pin ㉘ of IC201)	Video Signal
Adjusting point	R222 (FM carrier control)	R220 (deviation control)
Specification	3.8 MHz	1.0 ± 0.05 Vp-p

Note. 1:
Carry out this adjustment only when IC201 has been replaced or when the carrier setting (3.8 MHz) or the deviation (4.8 MHz) is found apparently out of specification.

Make this adjusment after the EE level has been completely adjusted.

Note. 2:
The video output terminal should be terminated with a 75-ohm impedance.

1. First make sure that the EE level playback video signal is at the speciffied level.
2. Place the unit in the record mode and get it ready for external input.
   Note:
   Do not connect anything to the external input terminal.
3. Hook up the frequency counter to TP203. Adjust R222 (FM carrier control) so that the counter reading be 3.8 MHz.
   Note:
   Make sure the white and dark clip controls are not now applied to the waveform.
4. Feed the colour bar signal (stair-case waveform) and make self-recording and playback.
5. Observe the video output terminal voltage (across the terminal resistor) on the oscilloscope screen. If the playback video signal level is below 1.0 Vp-p, turn R220 (deviation control) clockwise. If above 1.0 Vp-p, turn the control counter-clockwise. Now make self-recording and playback again.
6. Repeat the above step 5 to finally get the playback video signal level at 1.0 ± 0.05 Vp-p, as shown in Fig. 2-12.

Adjustment of white clip

Measuring instrument	Oscilloscope
Mode	Recording
Input signal	Standard colour bar (stair-case waveform)
Test point	TP201
Adjusting point	R225 (white clip control)
Specification	80 $^{+\ 0}_{-10}$ %

1. Place the unit to the record mode.
2. Feed the colour bar (stair-case waveform) signal.
3. Observing the output at TP201, adjust R225 (white clip control) so that the white peak overshoot be 80 (tolerance +0 –10) %.

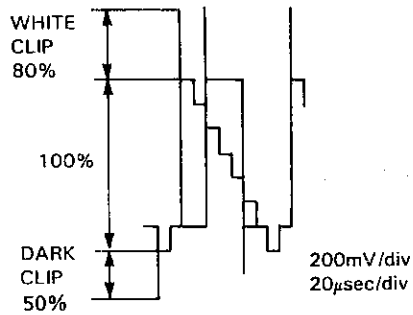


Figure 2-13.

Adjustment of dark clip

Measuring instrument	Oscilloscope
Mode	Recording
Input signal	Standard colour bar (stair-case waveform)
Test point	TP201
Adjusting point	R224 (dark clip control)
Specification	50 ± 10%

1. Place the unit to the recording mode.
2. Feed the colour bar (stair-case waveform) signal.
3. Observing the output at TP201, adjust R224 (dark clip control) so that the dark peak overshoot be 40 ± 10%. (See Fig. 2-13.)

Adjustment of recording current

Measuring instrument	Oscilloscope	
Mode	Recording (LP mode)	
Input signal	Standard colour bar (stair-case waveform)	
Test point	TP301 (GND at TP302) External trigger (video output terminal)	
Adjusting point	R3304 (recording FM control)	R518 (recording chroma control)
Specification	Sync tip level 84 ± 4mVp-p	Red level 18 ± 1mVp-p

Note:
TP301 and TP302 are located on the head amp PWB.

1. Place the unit to the record mode.
2. Feed the colour bar (stair-case waveform) signal.
3. Observing the waveform on the oscilloscope screen (external trigger at video output terminal), take the following steps.
   a) Connect the oscilloscope's GND and SIG leads to TP302 and TP301, respectively.
   b) Turn R3304 (recording FM control) to minimum.
   c) Adjust R518 (recording chroma control) to that the red level be 20 ± 1mVp-p as shown in Fig. 2-14.
4. Adjust R3304 (recording FM control) so that the sync tip be 100 ± 10mVp-p as shown in Fig. 2-15.

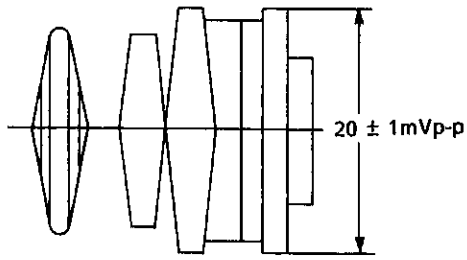


Figure 2-14.

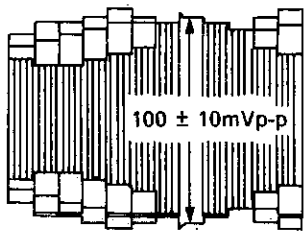


Figure 2-15.

■ ADJUSTMENT OF Y/C PLAYBACK CIRCUIT

Adjustment of playback video signal level

Measuring instrument	Oscilloscope
Mode	Playback
Tape used	Alignment tape (stair-case waveform)
Test point	Video output terminal
Adjusting point	R414 (playback level control)
Specification	1.0 ± 0.05Vp-p

Note:
The video output terminal should terminated with a 75-ohm impedance.

1. Insert the alignment tape (stair-case waveform) and place the unit to the playback mode.
2. Hook up the oscilloscope to the video output terminal. Adjust R414 (playback level control) so that the on-screen waveform be 1.0 ± 0.05Vp-p.

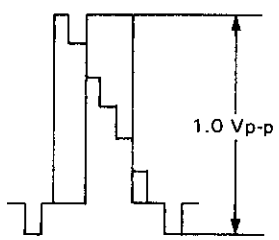


Figure 2-16.

Adjustment of APC

Measuring instrument	Frequency counter
Mode	Playback
Tape used	Alignment tape (VROCPSV)
Test point	TP501
Adjusting point	R506 (APC control)
Specification	4.433619MHz ± 20Hz.

1. Insert the alignment tape (VROCPSV) and place the unit to the playback mode.
2. Connect the frequency counter to TP501. Adjust R506 (APC control) so that the counter reading be 4.433619MHz ± 20Hz.

■ ADJUSTMENT OF SECAM SUB CHROMA CIRCUIT

Adjustment of record mode

Measuring instrument	Oscilloscope
Mode selection	Record mode
Input signal	Colour bar signal
Measuring point	TP5706
Adjusting control	T5703 (bell filter)
Specified value	———

1. Set the unit in the record mode.
2. Apply a SECAM colour bar signal to the unit and record it.
3. Observe the output of TP5706 with an osilloscope, and adjust T5703 so that the chroma signal becomes flat as shown in Fig. 2-17.

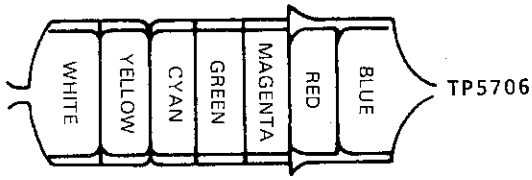


Figure 2-17.

Adjusting of sync gate in the record mode

Measuring instrument	Oscilloscope
Mode selection	Record mode
Input signal	Colour bar signal
Measuring point	TP5707 Video output terminal
Adjusting control	R5814 (Sync gate adj.) R5815 (Sync gate adj.)
Specified value	T_1:1.5µsec T_2:5.6µsec

1. Apply a SECAM colour bar signal to the unit and record it.
2. Connect an oscilloscope to TP5702 and video output terminal and make sure that the chroma signal output is just as shown in Fig. 2-18.
3. Adjust R5814 and R5815 so that the intervals T1 and T2 in the waveform of the output at TP5705 and those in the video output waveform should be corresponding to each other.

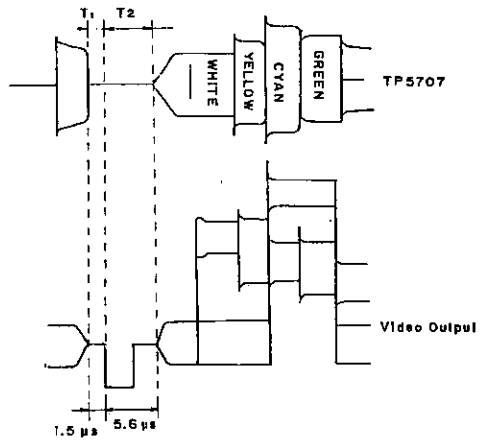


Figure 2-18.

Adjustment of recording equalizer (T5702)

1 Adjust T5702 so that the output at point ⓐ should be as shown in Fig. 2-19.

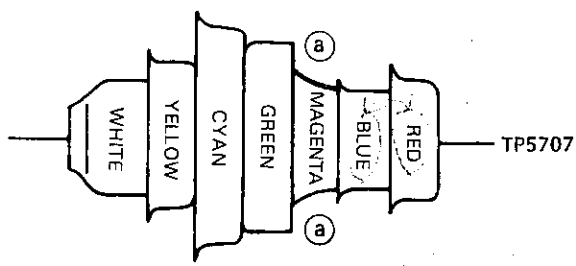


Figure 2-19.

Adjustment of record current (SECAM)

Measuring instrument	Oscilloscope
Mode selection	Record mode
Input signal	Colour bar signal
Measuring point	TP301(Ground: TP302)
Adjusting control	R5813 (Record chrominance level control)
Specified value	Cyan level: 16 ± 2mVp-p

1. Set the unit in the record mode.
2. Apply a SECAM colour bar signal (stair-step waveform) to the unit.
3. Observe the output of TP301 with an oscilloscope and make adjustment in the following manner.
   a) Connect the ground of the oscilloscope to TP302 and the signal to TP301.
   Note:
   TP301 and TP302 are located on the head amplifier PWB.
   b) Adjust R5813 (record chroma control) so that the red level should be 16mVp-p as shown in Fig. 2-20.
   Note:
   R5813 is located in the system control, servo PWB.

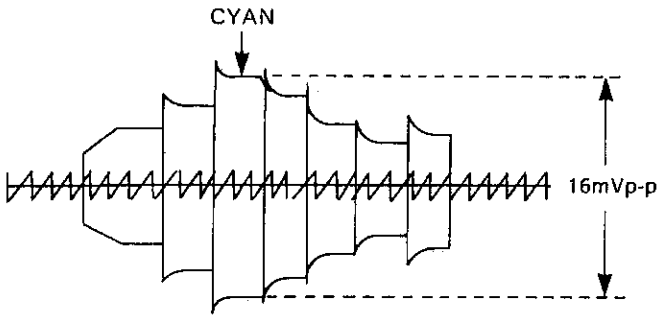


Figure 2-20.

Adjustment of playback equalizer

Measuring instrument	Oscilloscope
Mode selection	Playback mode
Input signal	Alignment tape (VROCSSV)
Measuring point	TP5702
Adjusting control	T5701(playback equalizer)
Specified value	———

1. Set the unit in the playback mode, and playback an alignment tape.
2. Observe the output of TP5702 with an osilloscope, and using T5701 make the oscillating width match with the flat portion of the red and blue test pattern.

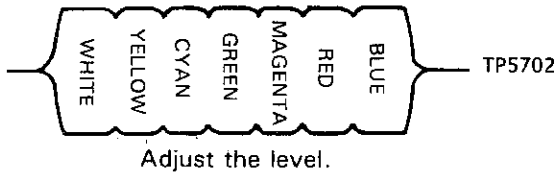


Figure 2-21.

■ ADJUSTMENT OF NTSC SUB CHROMA CIRCUIT

Adjustment of recording current

Measuring instrument	Oscilloscope
Mode	Recording (LP mode)
Input signal	Standard colour bar (stair-case waveform)
Test point	TP301(GND at TP302)
Adjusting point	R5811 (recording chroma control)
Specification	Red level 22 ± 2mVp-p

Note:
TP301 and TP302 are located on the head amp PWB.

1. Place the unit to the record mode.
2. Feed the colour bar (stair-case waveform) signal.
3. Observing the waveform on the oscilloscope screen, take the following steps.
   a) Connect the oscilloscope's GND and SIG leads to TP302 and TP301, respectively.
   b) Adjust R5811 (recording chroma control) to that the red level be 22 ± 2mVp-p as shown in Fig. 2-22.

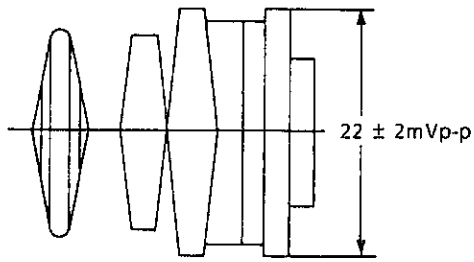


Figure 2-22.

Adjustment of APC

Measuring instrument	Frequency counter
Mode	Playback
Tape used	Aligment tape (VROCPSV)
Test point	Read of TP5708
Adjusting point	R5812 (APC control)
Specification	3.579545MHz ± 20Hz

1. Insert the alignment tape (VROCPSV) and place the unit to the playback mode.
2. Connect the frequency counter to TP5708. Adjust R5812 (APC control) so that the counter reading be 3.579545MHz ± 20Hz.

Adjustment of NTSC Skew Compensation

Measuring instrument	Oscilloscope Monitor TV
Mode	Playback (SP still mode)
Tape used	Alignment tape (VROCPSV)
Test point	CH-1: TP701 CH-2: Video output terminal
Adjusting point	R440 (Flicker control)
Specification	No flicker on the monitor TV screen

1. Insert the alignment tape (VROCPSV) and place the unit to the playback still mode.
2. Observe the output of TP701 (head switching pulse) and video output with an oscilloscope.
3. Adjust R440 so that there is a video level difference of ± 0.1V between Channel-1 output (head switching pulse's High level) and Channel-2 output (head switching pulse's Low level).
4. If the colour flicker is so noticeable on the TV monitor, finely adjust R440 so that there is the least deviation of flicker on the screen.

TROUBLESHOOTING GUIDE

TROUBLES OF CONTROL SYSTEM (SERVO, SYSTEM CONTROLLER CIRCUIT)

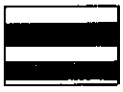
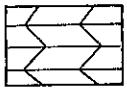
No.	Problems	Probable causes and countermeasures
1.	No power is supplied.	* The fuse is blown out: Check if there occurs a short-circuit in the internal circuit. * Check if there are produced AT6.5V, AT12V and AT9V in the power circuit: If not, this means that the power circuit is defective. * Check if the system controller (IC801) is normally functioning: Check if there are produced reset signals functioning: Check if there are produced reset signals (ACL) at pin **45** of IC801 and clock signal at pins **46** and **47** of IC801. * Check if the power control signal (Low level) goes out of pin **19** of IC801.
2.	No operation is available.	* Check if the end sensor signal (cassette housing side) and start sensor signal are applied to pins **56** and **57** of IC801 respectively. * Check if the unit is in timer mode. * Check if the unit is in sensor stop mode (DEW display). * The cam switch is poorly adjusted for its positioning. * Check if the unit is not in the child lock mode. * Check if the read-in of operation key is done well.
3.	After tape loading, the unit is stopped with the tape kept wound over the drum, or the cassette can't be ejected.	* The cam switch is poorly adjusted for its positioning. * IC803 is defective. * Check if AT 12V is supplied.
4.	The unit will stop immediately after it is set in playback or record mode.	* Check if the head switching pulse is applied to pin 3 (for the drum sensor) of IC801. * Check if the drum motor is rotating. * Check if the mixed signal of drum FG and drum PG is applied to pin **11** of IC701 of servo circuit.
5.	The unit will stop a few seconds after it has been set in playback or record mode.	* Check if the reel sensor pulse is applied to pin **58** (for the reel sensor) of IC801. * Check if the reel disk is rotating. * Check if the capstan motor is rotating. * Check if the reel idler is stained or defective.

No.	Problemes	Probable causes and countermeasures
6.	The tape is not running (the tape is not taken up at loading).	* The reel idler is defective. * The reel brake is defective. * Check if the reel idler is stained or defective.
7.	The unit stops sometimes during playback or recording. The tape can't be taken up when tape unloading. The tape is scratched when it is wound. Video search is impossible.	* Check if there are produced capstan motor control singals at the system controller (servo clock signal at pin **27** of IC801, servo data signal at pin **28** of IC801, capstan motor pull up signal at pin **29** of IC801, capstan motor unloading signal at pin **30** of IC801, loading motor control forward signal at pin **63** of IC801, cassette and loading motors revers control signal at pin **62** of IC801), * IC701 is defective.
8.	Fine noises appear at the reproduced picture.	* Check if the mixed signal of drum PG and drum FG is applied to pin **11** of IC701. * The playback phase generator MM control is misadjusted (R751 for PAL/MESECAM signal, R753 for NTSC signal).
9.	Noises appear intermittently at the reproduced picture.	* Check for capstan servo circuit (capstan frequency generator's signal at pin **41** of IC701 and playback control signal at pin 40 of IC701).
10.	The picture collapses in the horizontal direcrion.	* The drum servo circuit is defective. * Check if the mixed signal of drum PG and drum FG is applied to pin **11** of IC701. * Check if the switching of 50Hz mode (PAL/MESECAM) and 60Hz mode (NTSC) is done properly.
11.	Noise bar appears in slow mode, or noise bar is not positioing properly.	* Check if the PB CTL signal is input to pin **1** of IC801.
12.	When system sw is in auto position, the selection of E-E (REC) mode does not function well.	* Check if the composit sync signal from pin **1** of AC connector is, after being removed its vertical sync signal at Q801, applied to pin **4** of IC801. * Check if the output of pin 54 of IC801 is sent to pin **15** of IC802 (at 50Hz, pin **54** is "H" level, and at 60Hz, pin **54** is "L" level). * Check if the voltages of pin 17 and pin 18 of IC802 are appropriate values (at EE (REC) mode, both pin 17 and pin 18 of IC802 are approx.5V). * Check if the signal applied to pin **15** of IC802 is output from pins **8, 9** and **10** of IC802 (at 50Hz, pins **8, 9** and **10** are approx. 5V). * IC801 and IC802 are defective.

No.	Problems	Probable causes and countermeasures
13.	When system sw is in auto position, the selection of 50/60 Hz in PB mode does not function well.	* Chek if the outputs from pin 52 and pin 53 of servo iC701 are sent to pin 9 and pin 10 respectively. * Check if the selecting result is sent from pin 53 of IC801 to pin 16 of IC802. * Chek if the voltages of pins 17 and 18 of IC802 are appropriate values (at PB, pins 17 and 18 are 0V). * Check if the input signal to pin 16 of IC802 is output from pins 8, 9 and 10 of IC802 (at 50Hz, pins 8, 9 and 10 are approx. 5V).
14.	Linear time counter does not operate.	* Check if the PB CTL CLOCK signal is output from pin 47 of IC701 and is input to pin 1 of IC802. * Check if pin 3 of IC802 (RESET terminal) is kept in resetting (keeping "High" level). * Check if the counter pulse is output from pin 2 of IC802 and is input to pin 20 of IC5001 inside of timer circuit. * Check if IC802 is defective.

TROUBLES OF SOUND AND REPRODUED PICTURE(Y/C AND AUDIO CIRCUIT)

No.	Problems		Probable causes and countermeasures
1.	No picture appears.	At E-E mode	* Check if the video signal (E-E signal) is applied to pin 4 of IC201, if the video signal goes out of pin 10, and if proper voltage is applied to each pin of IC201. * Check if the video signal comes into pin 6 or pin 1 of IC1502 and goes out of pin 8 of IC1502 (in tuner mode). * Check if the "$\overline{EE}$ 5V" signal is at low level at pin 7 of IC1502 and if the EE (H) signal is at high level at pin 12 of IC201. * Check if the video signal comes into pin 1 of K401 and goes out of pin 5 of K401.
		At playback of standard tape	Make sure that there appears a normal picture at E-E mode. * Check if the playback FM signal is applied to pin 4 of connector CG. * Check if the playback FM signal is applied to pins 20 and 21 of IC301. * Check if Vcc 5V is applied at pin s 7 and 24 of IC401. * Check if the video signal (demodulator output) is given at pin 9 of IC401. * Check if the video signal is given at pin 25 of IC401. * Check if the base of Q210 is at high level (approx. 4V).
		At playback of the tape recorded by oneself	Before this checking, make sure that normal playback is possible with standard tape. * check if there is FM signalat pin 9 of IC401. * Check if there is video signal at pin 6 of IC201. * Check if there is video signal at pin 10 of IC201.

No.	Problems	Probable causes and countermeasures
2.	No colour appears. (PAL / MESECAM)	* Check if there is chroma signal at pin 30 of IC501. * APC is misadjusted (R506). It is not allowed to readjust them, this means that IC501 is defective. * Check if IC501 is normally functioning.
3.	No colour appears in NTSC 3.58 mode.	* Make sure "NTSC 3.58 H" signal at pin 11 of K502 is at "H" level. * Put the unit in playback mode and check if the chroma signal is given out at pin 30 of IC5701. * Check if APC (R5812) has been properly adjusted. (If no adjustment is effective, the IC itself is defective.) * Check if the "ROTATION" pulse is put in to pin 5 of IC5701. (If the output from the system controller does not reach this pin, the IC5701 or IC501 is defective.) * Put the unit in record mode and see if the chroma signal is given out at pin 16 of IC5701. * Be sure that the voltage at each pin of IC5701 is as specified.
	No colour appears in SECAM mode.	* Make sure "SECAM 5V" signal at pin 22 of K503 is at "H" level. * Check if the chroma signal is applied at TP5702. * Check if the gate (R5814 and R5815) has been properly adjusted. * Check also if the bell filter (T5701, T5702 and T5703) has been properly adjusted. * Be sure that the voltage at each pin of IC5702 is as specified.
4.	No picture appears over the screen in still/slow mode or no lateral stripes in SP search mode in NTSC 3.58/4.43 mode. 	* Put the unit in playback mode in NTSC mode and make sure pins 6 and 10 of K401 are at 9V level. * Readjust the flicker control (R440). * With the unit in playback mode in NTSC mode, check if the video signal is given out to the emitter of Q4405. * Then make sure the video signal is given out to pin 12 of IC4401. * Finally make sure the 17-MHz clock waveform signal is put in to pin 9 of IC4401.
5.	Excessive skew is found in SP search mode in NTSC 3.58/4.43 mode.  The image above and below the noise bars is seen skew as sketched here.	* Make sure the pulse signal is put in to pin 3 of K401.

No.	Problems	Probable causes and countermeasures
6.	The picture collapses when the tape recorded by oneself is played back.	* Check if there is a normal voltage at each pin of the head amplifier. * Check the video head or replace it a new one.
7.	Noises appear on the whole of picture when the tape recorded by oneself is played back.	* Check if there is a normal voltage at each pin of the head amplifier. * Check the video head or replace it a new one.
8.	Noises is noticeable at E-E mode or when the tape recorded by oneself is played back.	* The tuner and/or RF converter are defective. * Check if AT 5V is applied at pin 9 of the RF converter. * Check the coaxial cable between the tuner and the RF converter for breakage. * Disonnect the antenna cable to see if the DC voltage at the tuner's AGC terminal goes above 6V.
9.	Noises appear on the picture when the tape is played back with standard tape. Tape does not run.	* Check each voltage and motor unit of capstan motor drive circuit. * Clean the video head or replace it a new one.
10.	There appears no E-E sound.	* First make sure the E-E picture appears as specified. (If not, the muting effect is produced.) * ALC at IC601 operates improperly. * Check if there is audio signal at pin 17 of IC601. * The audio muting circuit is defective.
11.	There appears no sound at playback mode.	* The audio head is defective. * Check if the control signal is applied. (If not, the muting effect is produced.) * Check if playback audio signal is applied to pin 7 of IC601 and goes out of pin 17.
12.	Sound is distorted.	* The audio head is magnetized or defective. * Bias current is insufficient.
13.	The reasonance in the recording or playback is incorrect.	* The audio head is magnetized or defective. * Bias oscillator circuit is defective.
14.	Recording is impossible.	* Bias oscillator circuit is not normally functioning. * Check if pin 12 of Audio module (bias control 9V) is at high level.
15.	Noise and hum appear frequently during playbak or recording.	* The audio head is defective.

OTHER TROUBLESHOOTING GUIDE

COMPATI TV SERIES-NAME/CHASSIS-NAME TABLE

No.	MODEL NAME	SERIES NAME	CHASSIS NAME
1	14S11-A1	11 SYSTEM	7P-M
2	14S11-A2	SOLAR 21	7P-M
3	18S11-A1	11 SYSTEM	7P-M
4	18S11-A2	SOLAR 21	7P-M
5	20S11-A1	11 SYSTEM	7P-M
6	20S11-A2	SOLAR 21	7P-M
7	21S11-A1	11 SYSTEM	7P-M
8	21S11-A2	SOLAR 21	7P-M
9	21S21-A1	SOLAR 21	7P-W
10	21S21-A2	SOLAR 22	7P-W
11	29S21-A1	SOLAR 21	7P-LW1
12	29S21-A2	SOLAR 22	7P-LW1
13	33S21-A1	SOLAR 21	7P-LW2
14	33S21-A2	SOLAR 22	7P-LW2
15	25W11-B1	WILLING 21	8P-MW2
16	29W11-B1	WILLING 21	8P-MW1
17	C-20B1SPN	3 SYSTEM	6P-T
18	C-20B2SPN	3 SYSTEM	6P-T
19	C-20B3SPN	3 SYSTEM	6P-T
20	C-26B1SPN	3 SYSTEM	6P-L
21	C-3710SP	PAL/MESECAM DUAL	8P-SR
22	DV-2130EX	SUPER MULTI	6P-SR1
23	DV-1410SPN	11 SYSTEM	6P-M
24	DV-1810SPN	11 SYSTEM	6P-M
25	DV-2010SPN	11 SYSTEM	6P-M

Note : Some of the function keys on the remote control unit are not effective with TV sets that do not have such functions.

SCHEMATIC DIAGRAM

IMPORTANT SAFETY NOTICE:
BE SURE TO USE GENUINE PARTS FOR SECURING THE SAFETY AND RELIABILITY OF THE SET. PARTS MARKED WITH "⚠" AND PARTS SHADED (IN BLACK) ARE ESPECIALLY IMPORTANT FOR MAINTAINING THE SAFETY AND PROTECTING ABILITY OF THE SET.
BE SURE TO REPLACE THEM WITH PARTS OF SPECIFIED PART NUMBER.

SAFETY NOTES:

1. ***DISCONNECT THE AC PLUG FROM THE AC OUTLET BEFORE REPLACING PARTS.***
2. ***SEMICONDUCTOR HEAT SINKS SHOULD BE REGARDED AS POTENTIAL SHOCK HAZARDS WHEN THE CHASSIS IS OPERATING.***

NOTES:

1. *The unit of resistance "ohm" is omitted (k = 1000 ohm, M = 1 Meg ohm).*
2. *All resistors are 1/8 watt, unless otherwise noted.*
3. *The unit of capacitance "F" is omitted (μ = μF, p = μμF).*
4. *The values in parentheses are the ones in the PB mode; the values without parentheses are the ones in the REC mode.*

VOLTAGE MEASUREMENT CONDITIONS:

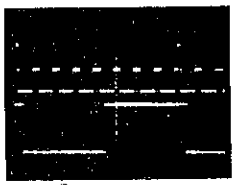
1. ***DC voltages are measured between points indicated and chassis ground by VTVM,*** *with AC100V~240V, 50/60Hz supplied to unit and all controls are set to normal viewing picture unless otherwise noted.*
2. *Voltages are measured with 10000μV B & W or colour signal.*

WAVEFORM MEASUREMENT CONDITIONS:
10000μV 87.5 percent modulated colour ber signal is fed into tuner.

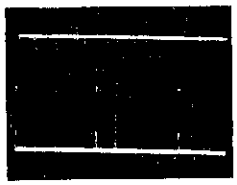
CAUTION:
This circuit diagram is original one. Therefore there may be a slight difference from yours.

WAVE FORMS

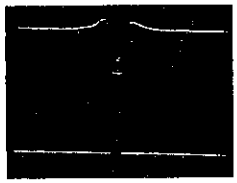
SYSTEM CONTROL, SERVO, IF PWBs



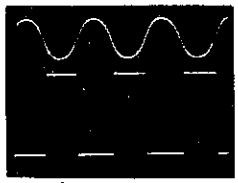
IC701 (11) pin
Frequency generator/Pulse generator
2V/Division
5msec/Division
TP701
Head switching pulse
2V/Division
5msec/Division
— PAL Playback mode —



IC801 (4) pin
Vertical sync
2V/Division
5msec/Division
Q801 Base
Vertical sync
0.5V/Division
5msec/Division
— PAL mode —

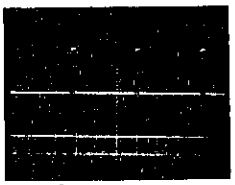


IC702 (8) pin
Drum pulse generator
1V/Division
10msec/Division
IC702 (7) pin
Drum pulse generator
2V/Division
10msec/Division
— PAL Playback mode —

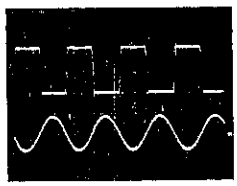


IC702 (14) pin
Drum frequency generator Signal
1V/Division
0.5msec/Division
IC701 (1) pin
Drum frequency generator Signal
2V/Division
0.5msec/Division
— PAL Playback mode —

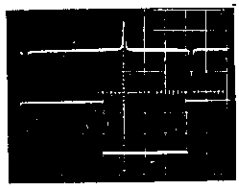
IC801 (9) pin
Capstan frequency generator signal
2V/Division
5msec/Division
IC801 (10) pin
Playback control signal
2V/Division
5msec/Division
— PAL Playback mode —



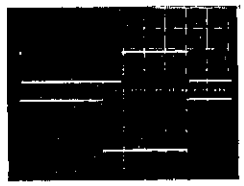
IC701 (55) pin
Composite sync
2V/Division
20μsec/Division
IC701 (58) pin
fsc clock
500mV/Division
20μsec/Division
— PAL Playback mode —



IC701 (41) pin
Capstan frequency generator signal
2V/Division
0.5msec/Division
Connector, AN (15) pin
Capstan frequency generator signal
1V/Division
0.5msec/Division
— PAL Playback mode —

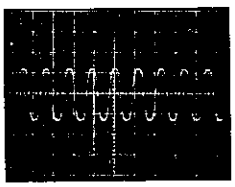


IC701 (40) pin
Playback control signal
1V/Division
5msec/Division
TP701 pin
Head switching pulse
2V/Division
5msec/Division
— PAL Playback mode —

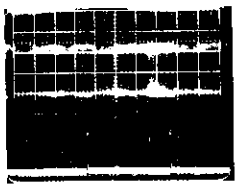


IC701 (33) pin
Record control signal
2V/Division
5msec/Division
TP701 pin
Head switching pulse
2V/Division
5msec/Division
— PAL Record mode —

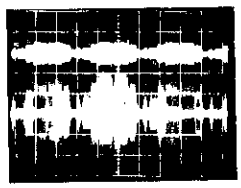
Y/C, AUDIO PWB



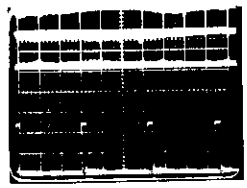
TP504
4.43MHz oscillator signal
0.2μsec/Division
0.2V(AC)/Division
— PAL Playback mode —



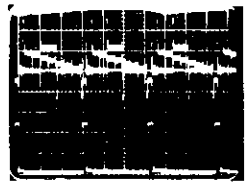
Connector CG (1) pin
Vertical sync pulse
5msec/Division
1V(DC)/Division
— Record mode —



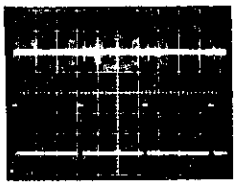
Q501, Q502 emitter
Playback chrominance signal
20μsec/Division
0.1V(AC)/Division
Q505, Q506, Q507 emitter
Playback chrominance signal
20μsec/Division
0.1V(AC)/Division
— Playback mode —



TP202
Luminance FM signal
20μsec/Division
0.5V(AC)/Division
IC201 (2) pin
Horizontal sync pulse
20μsec/Division
2V(DC)/Division
— Record mode —

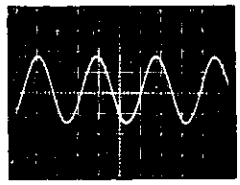


TP201
Preemphasis signal (Y signal)
20usec/Division
0.2V(AC)/Division
IC201 (2) pin
Horizontal sync pulse
20μsec/Division
2V(DC)/Division
— Record mode —

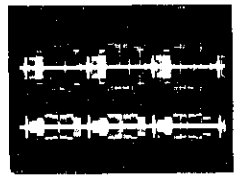


Q503 emitter
Record chrominance output signal
20μsec/Division
50mV(AC)/Division
IC201 (2) pin
Horizontal sync pulse
20μsec/Division
2V(DC)/Division
— Record mode —

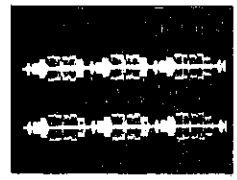
Video output terminal
(Terminated with 75 ohm resistor)
Video output signal
20μsec/Division
0.2V(AC)/Division
— E-E mode —



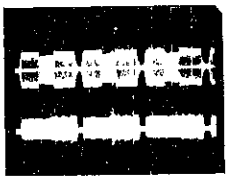
Full erase bias
5μsec/Division
20V(AC)/Division



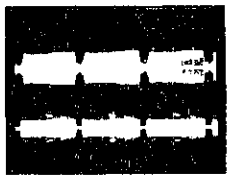
Q5707 emitter
20μ sec/Division
200mV (AC)/Division
TP5707 (Q5702 emitter)
20μ sec/Division
100mV (AC)/Division
— NTSC Record mode —



Q5707 emitter
20μ sec/Division
200mV/Division
Q5701 emitter
20μ sec/Division
500mV/Division
— NTSC Playbak mode —



TP5706
20μ sec/Division
500mV (AC)/Division
TP5707
20μ sec/Division
50mV (AC)/Division
— SECAM Record mode —

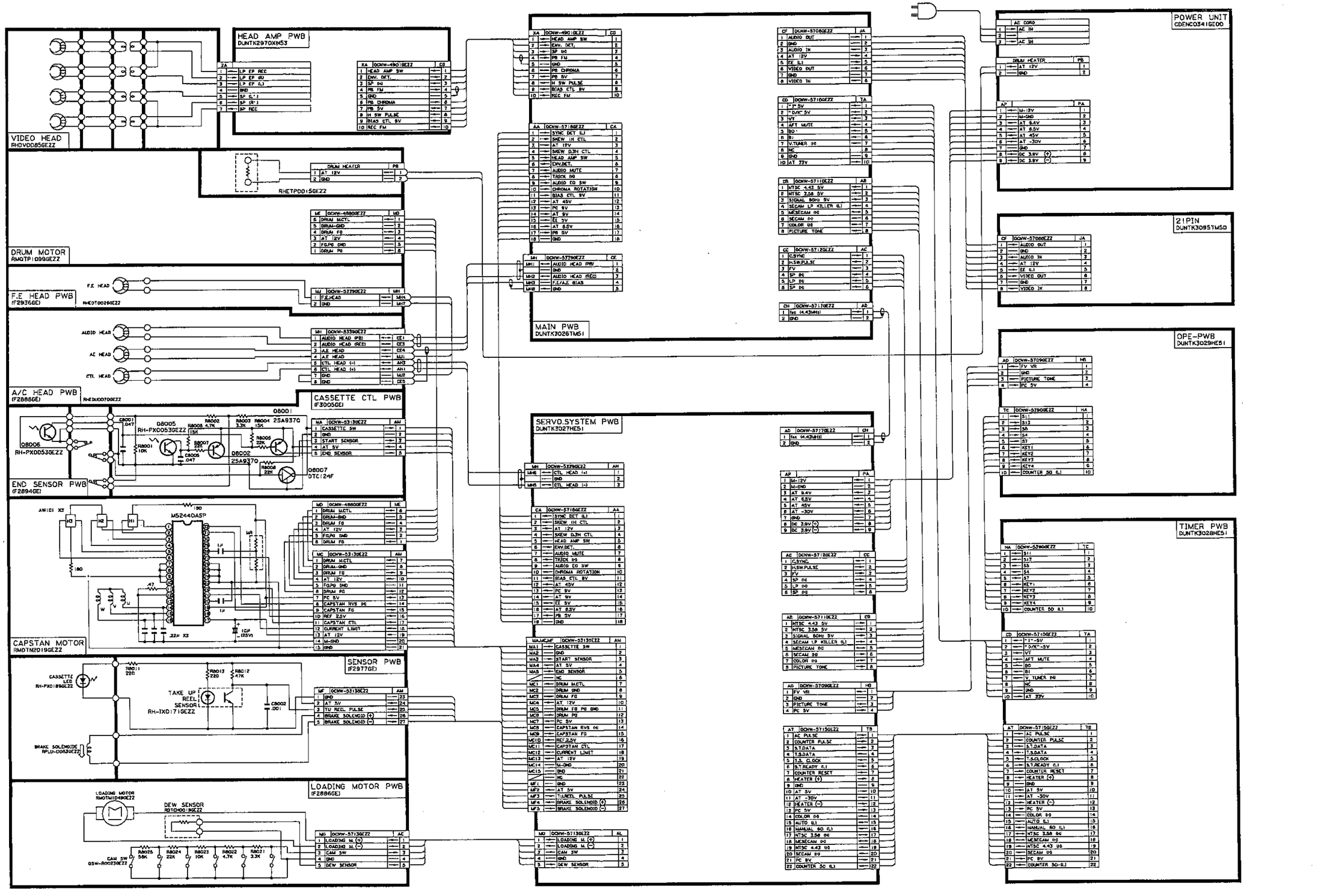


TP5706
20μ sec/Division
500mV (AC)/Division
Q5705 emitter
20μ sec/Division
200mV/Division
— SECAM Playbak mode —

MEMO

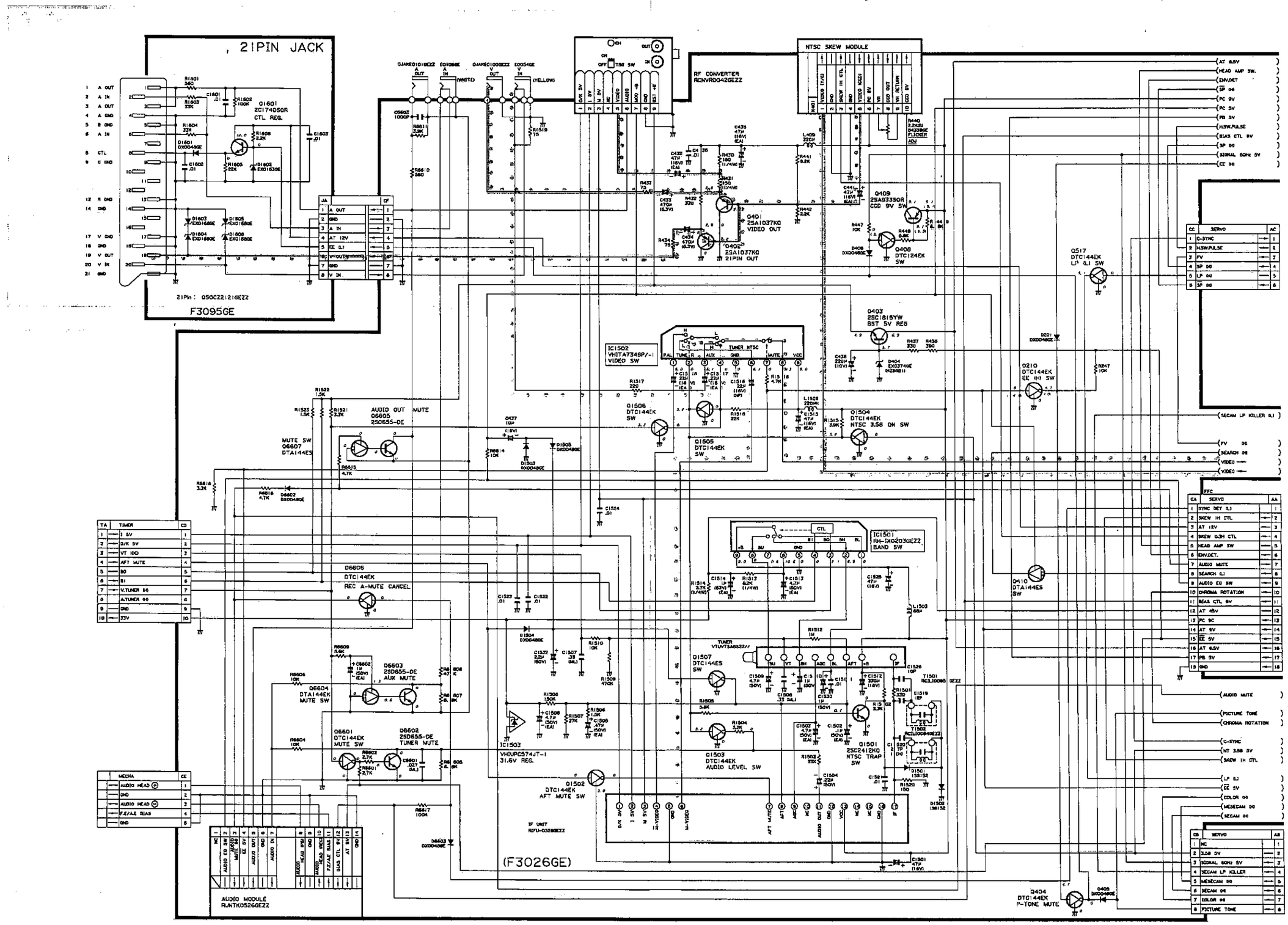
VC-780E
VC-790ET

OVERALL DIAGRAM



MAIN CIRCUIT (1)

Record Composit Video Signal
Playback Composit Video Signal
} E-E Signal
Record Luminance Signal
Video E-E Signal

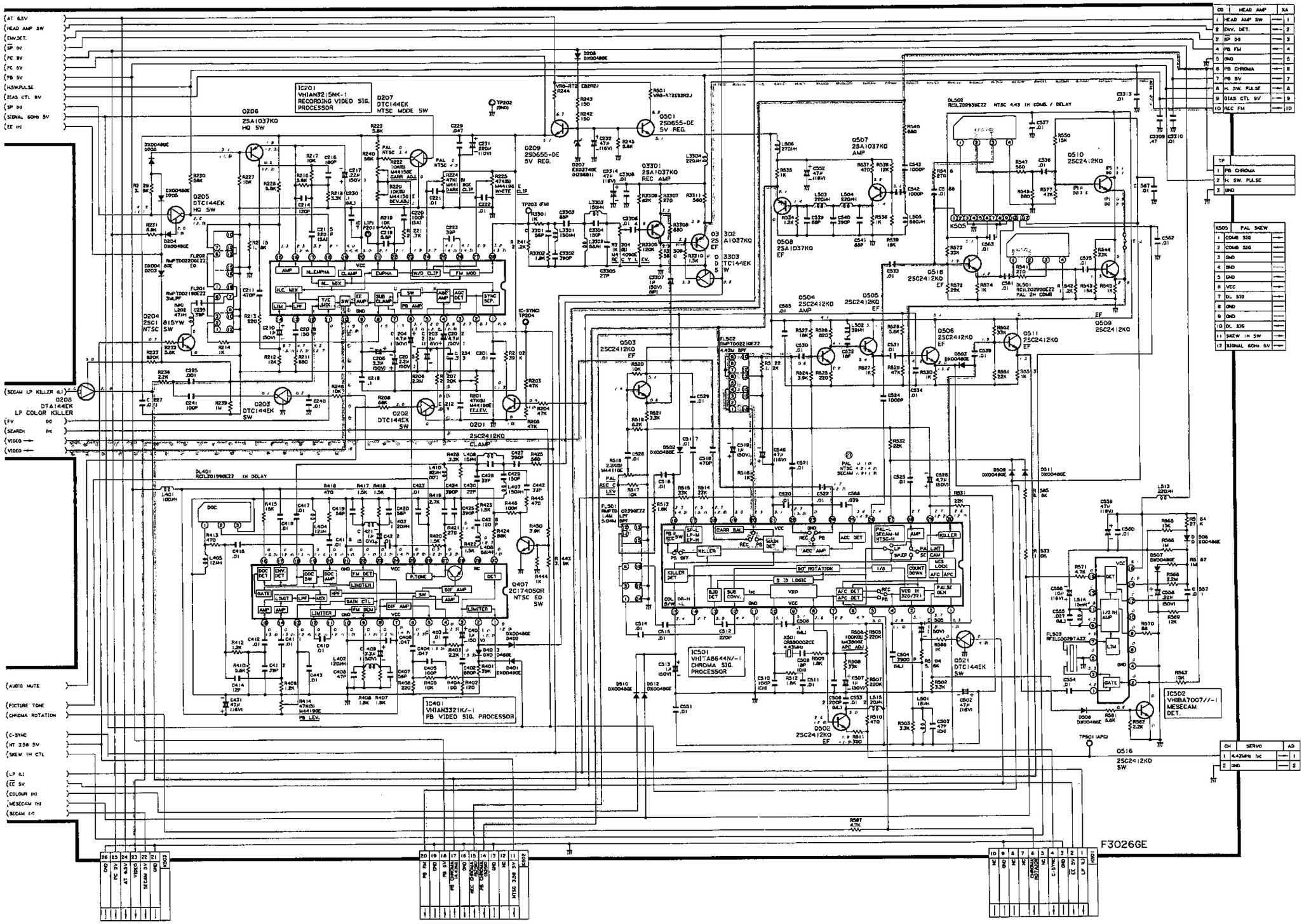


MAIN CIRCUIT (2)

Playback Luminance Signal — Playback chrominance signal

Record Luminance Signal — Record Chrominance Signal

Video E-E Signal

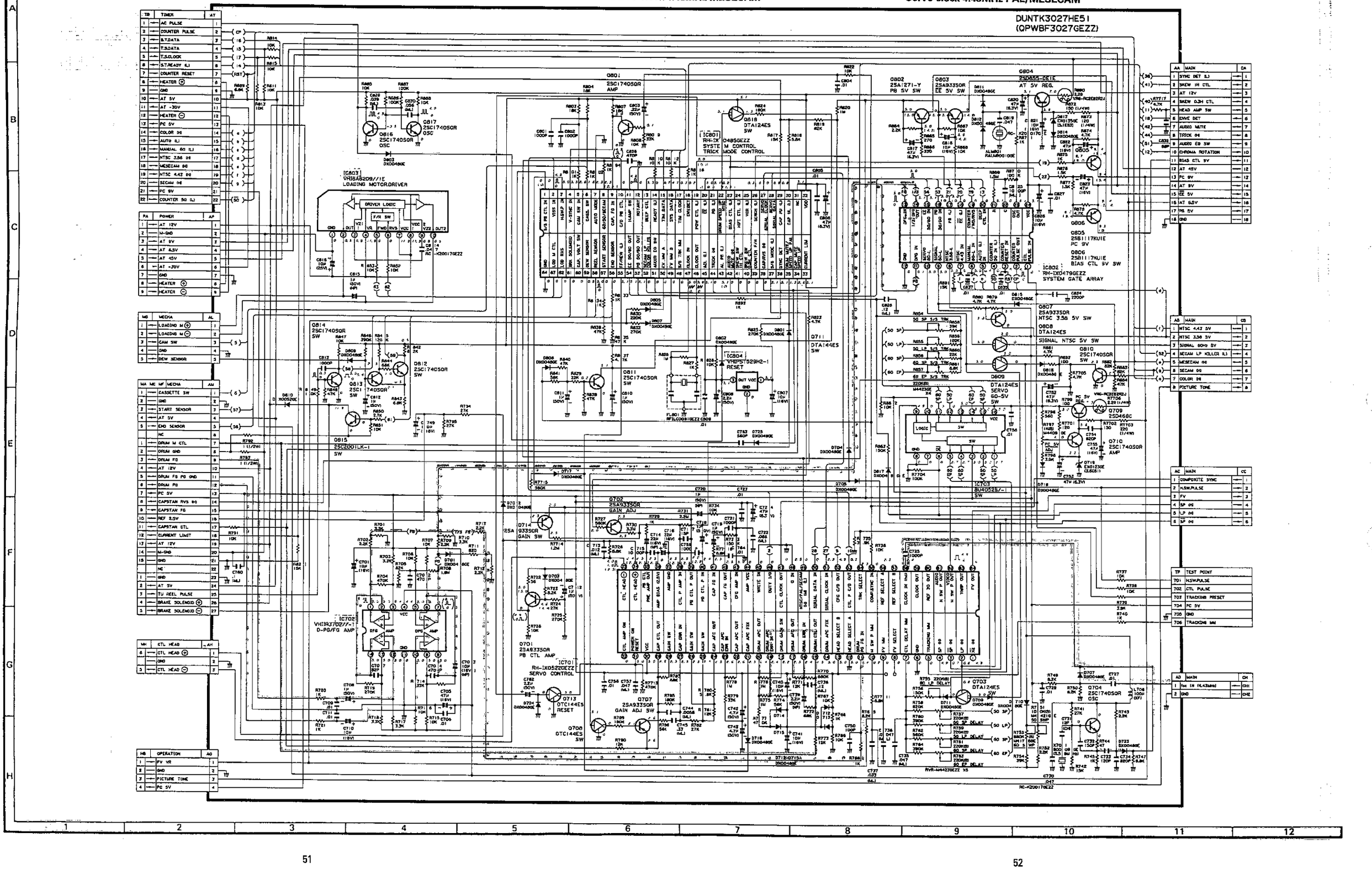


SYSTEM CONTROL, SERVO CIRCUIT

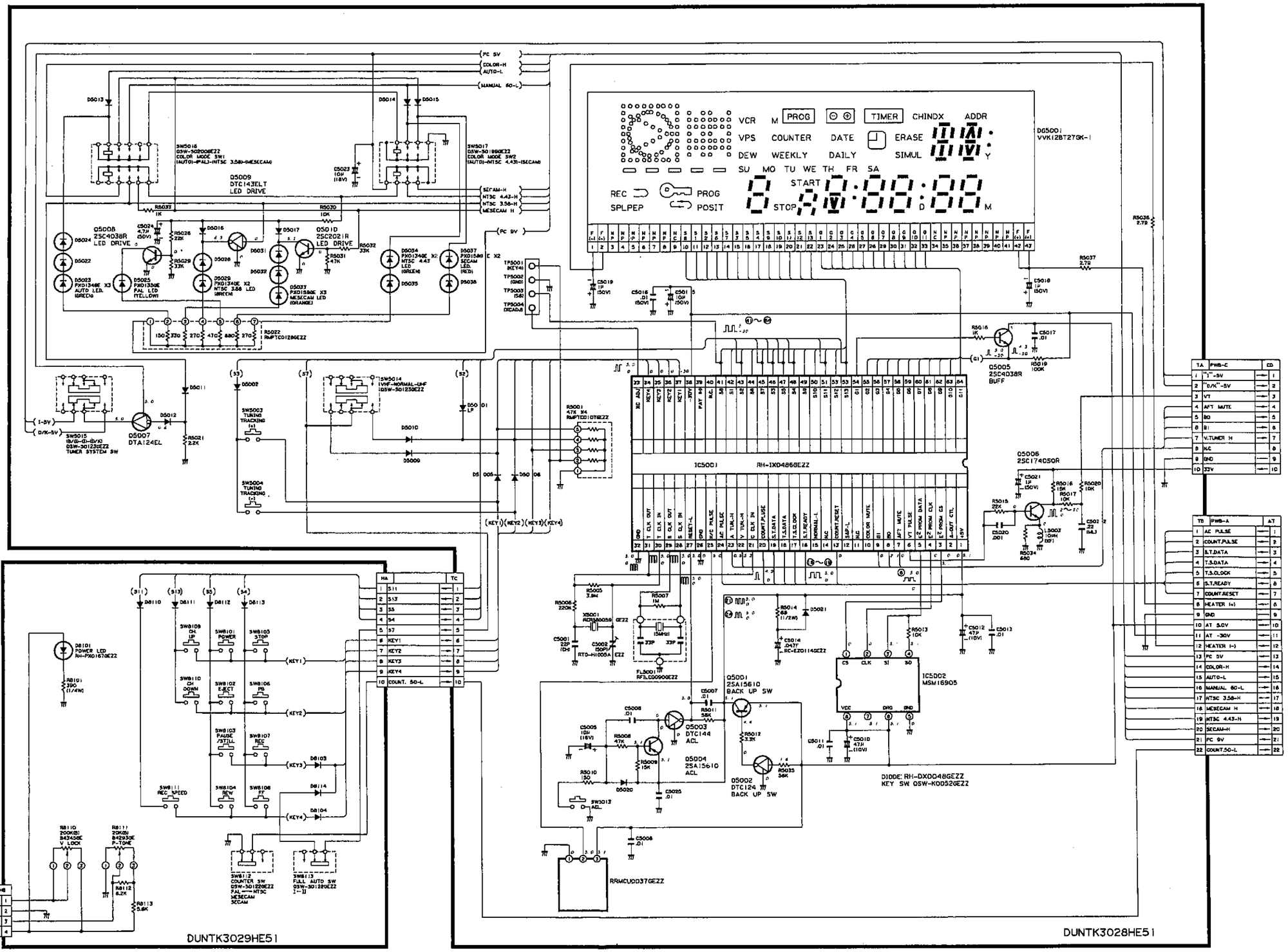
Drum Control Signal
Drum Frequency Generator Signal
Drum Pulse Generator Signal
Servo clock 4.43MHz MESECAM

Capstan Control Signal
Capstan Frequency Generator Signal
Capstan Pulse Generator Signal
Servo clock 4.43MHz PAL/MESECAM

Reference Signal
Servo clock 3.58MHz NTSC



OPERATION CIRCUIT / TIMER CIRCUIT



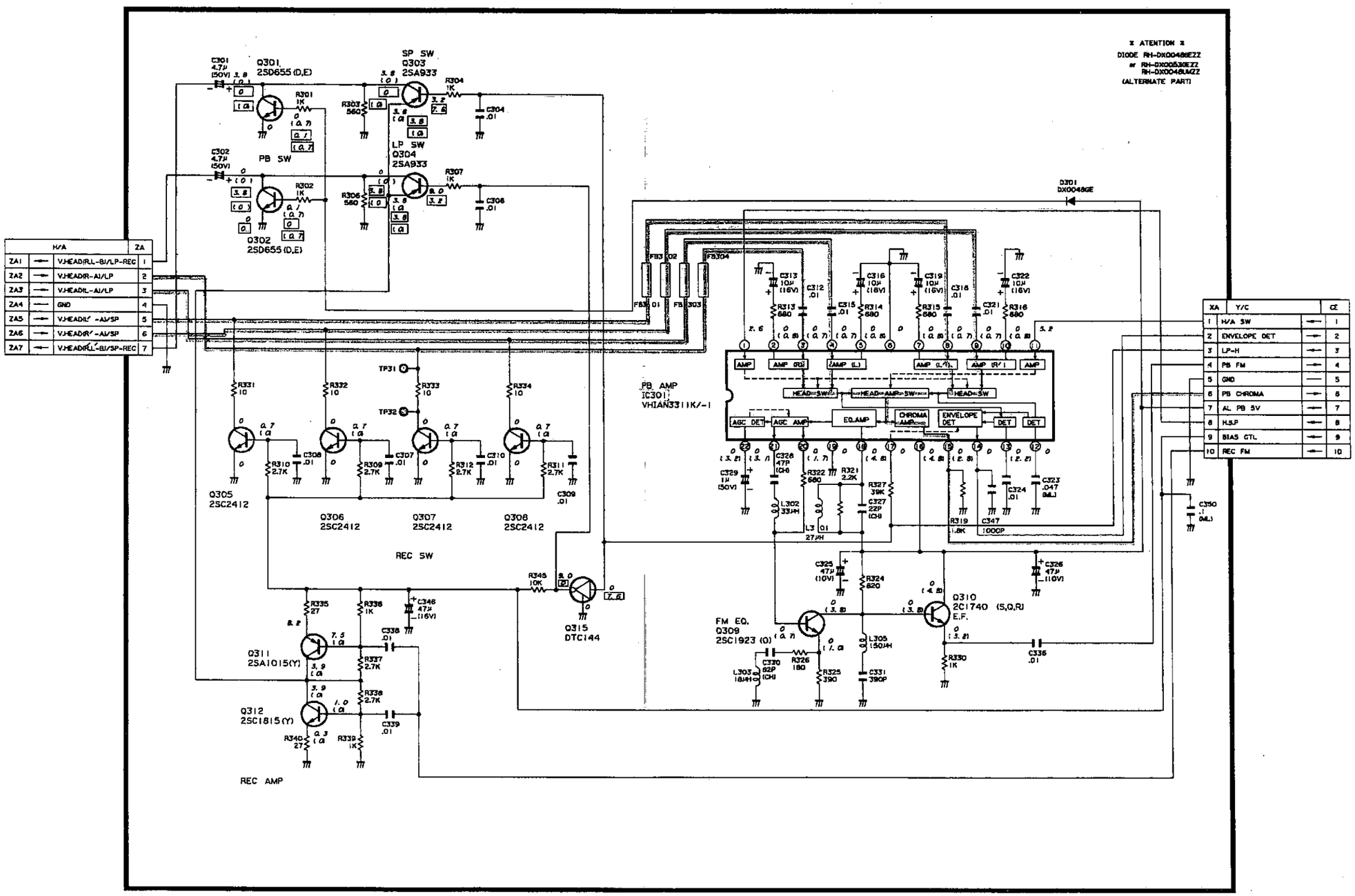
HEAD AMPLIFIER CIRCUIT

Playback chrominance signal

Playback luminance signal

Record luminance signal

Record chrominance signal

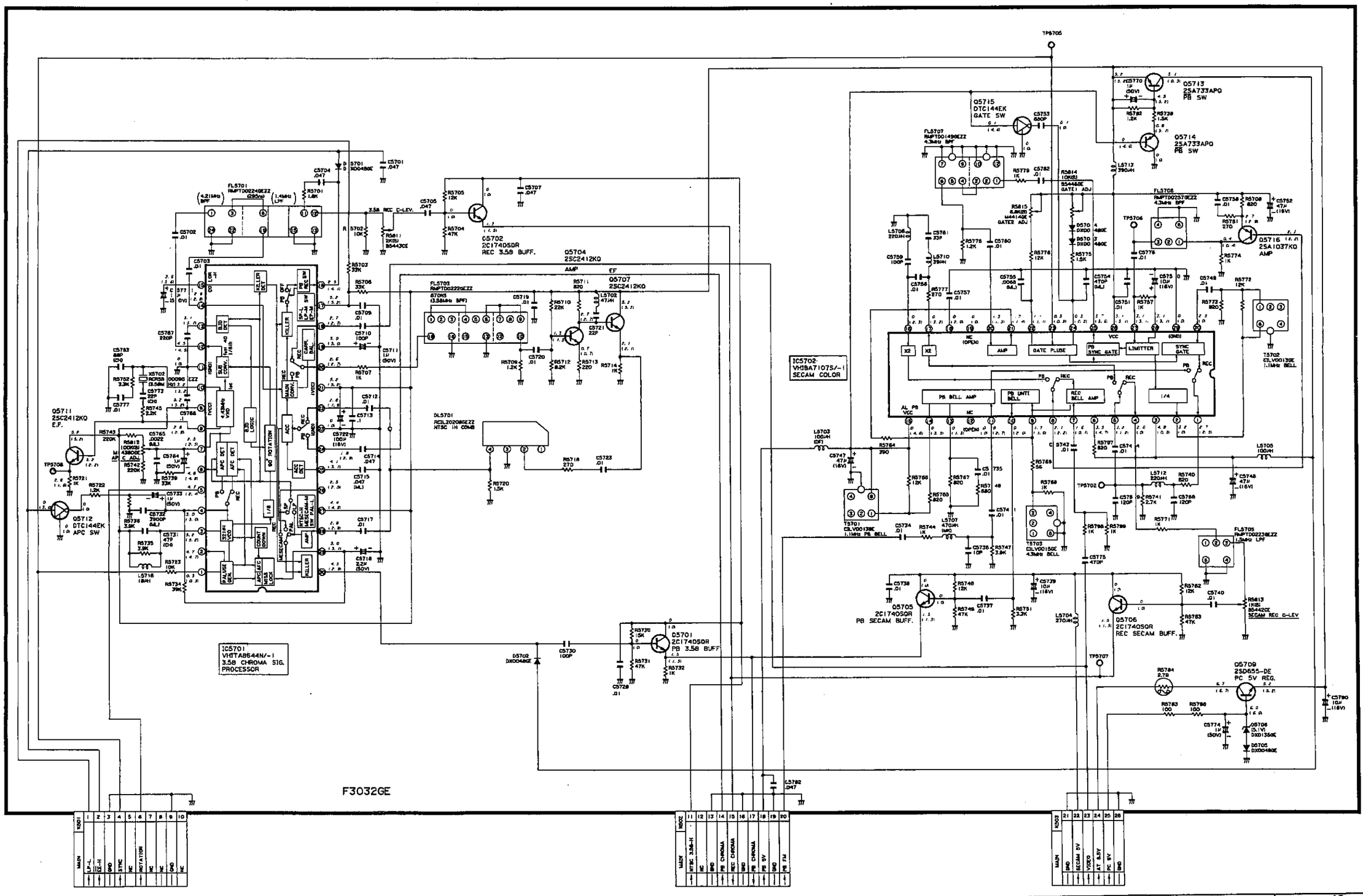


VC-780E
VC-790ET

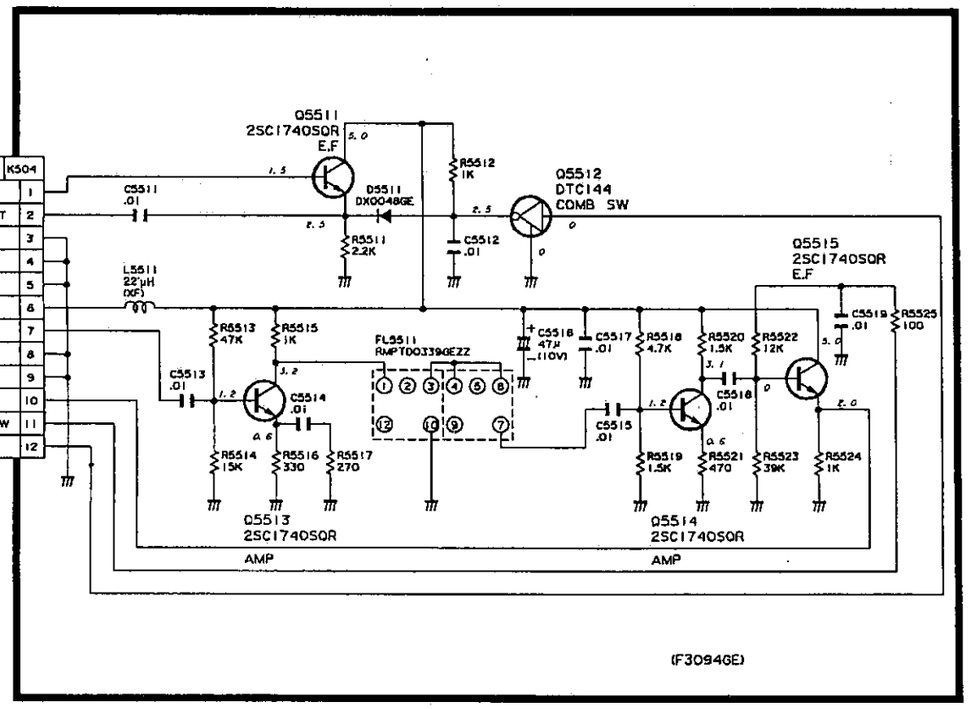
SUB CHROMA CIRCUIT

Playback Chrominance Signal

Record Chrominance Signal

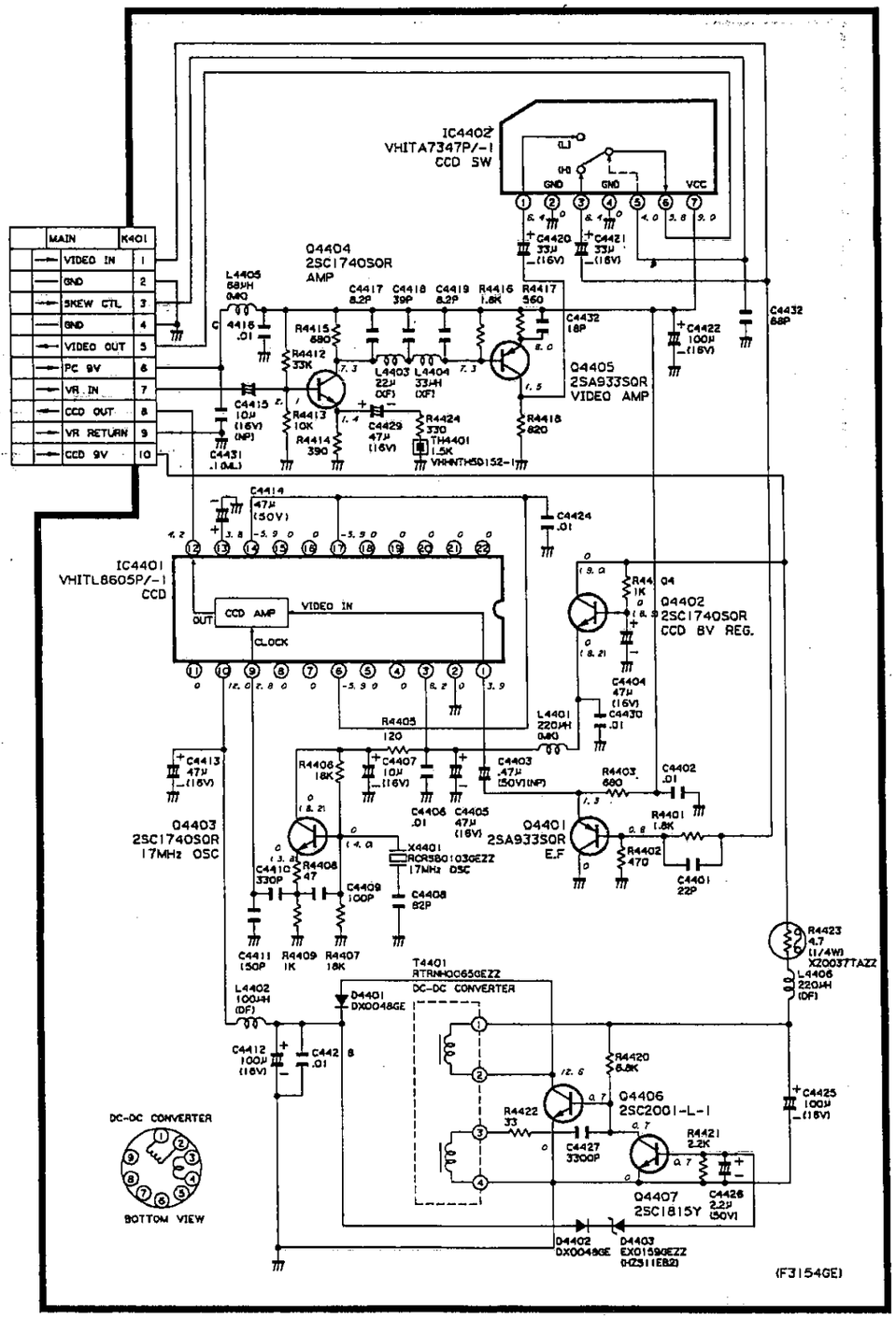


PAL SKEW CONTROL CIRCUIT



(F3094GE)

NTSC SKEW CONTROL CIRCUIT



(F3154GE)

AUDIO CIRCUIT

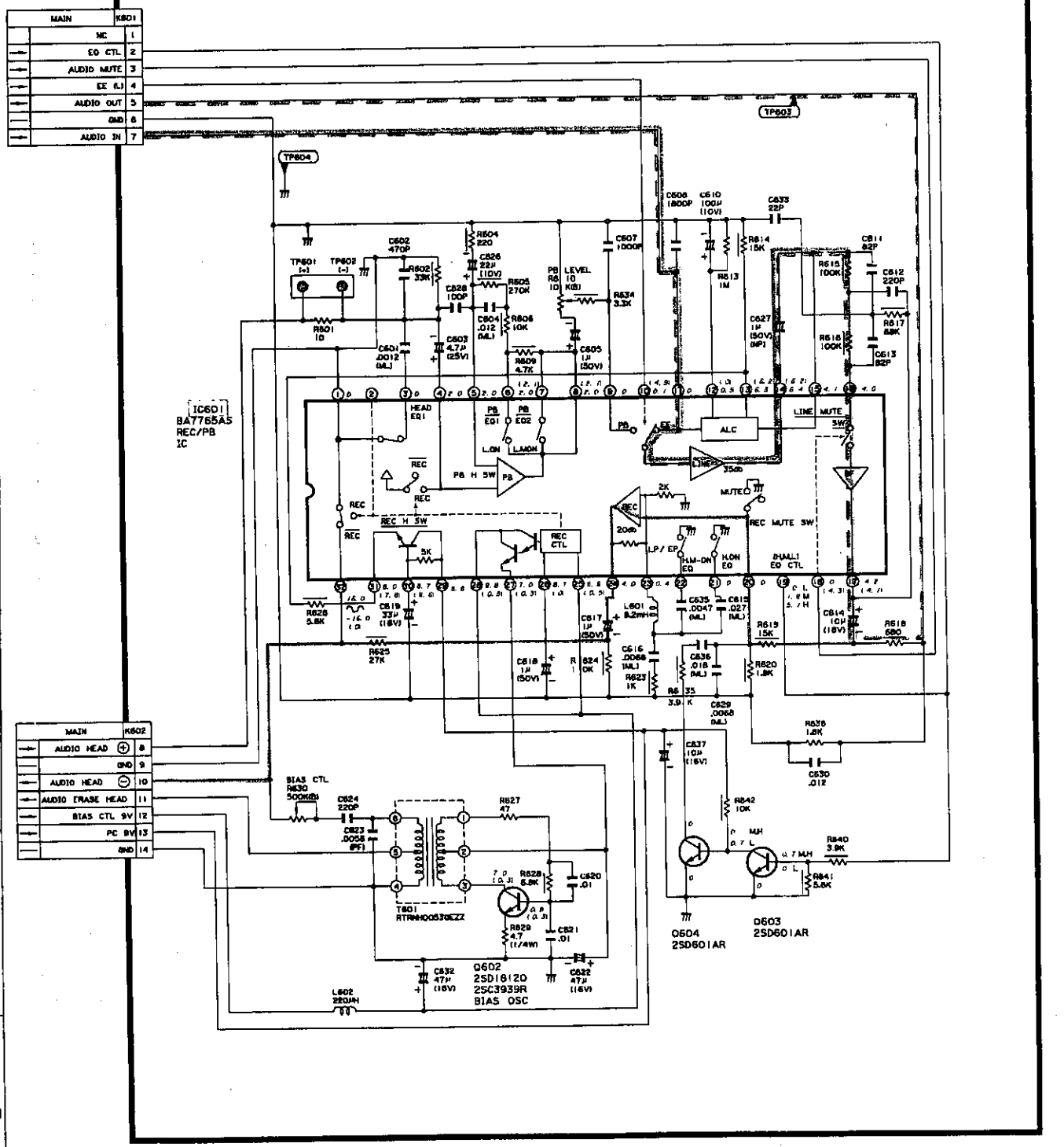
Audio Playback Signal

Audio Record Signal

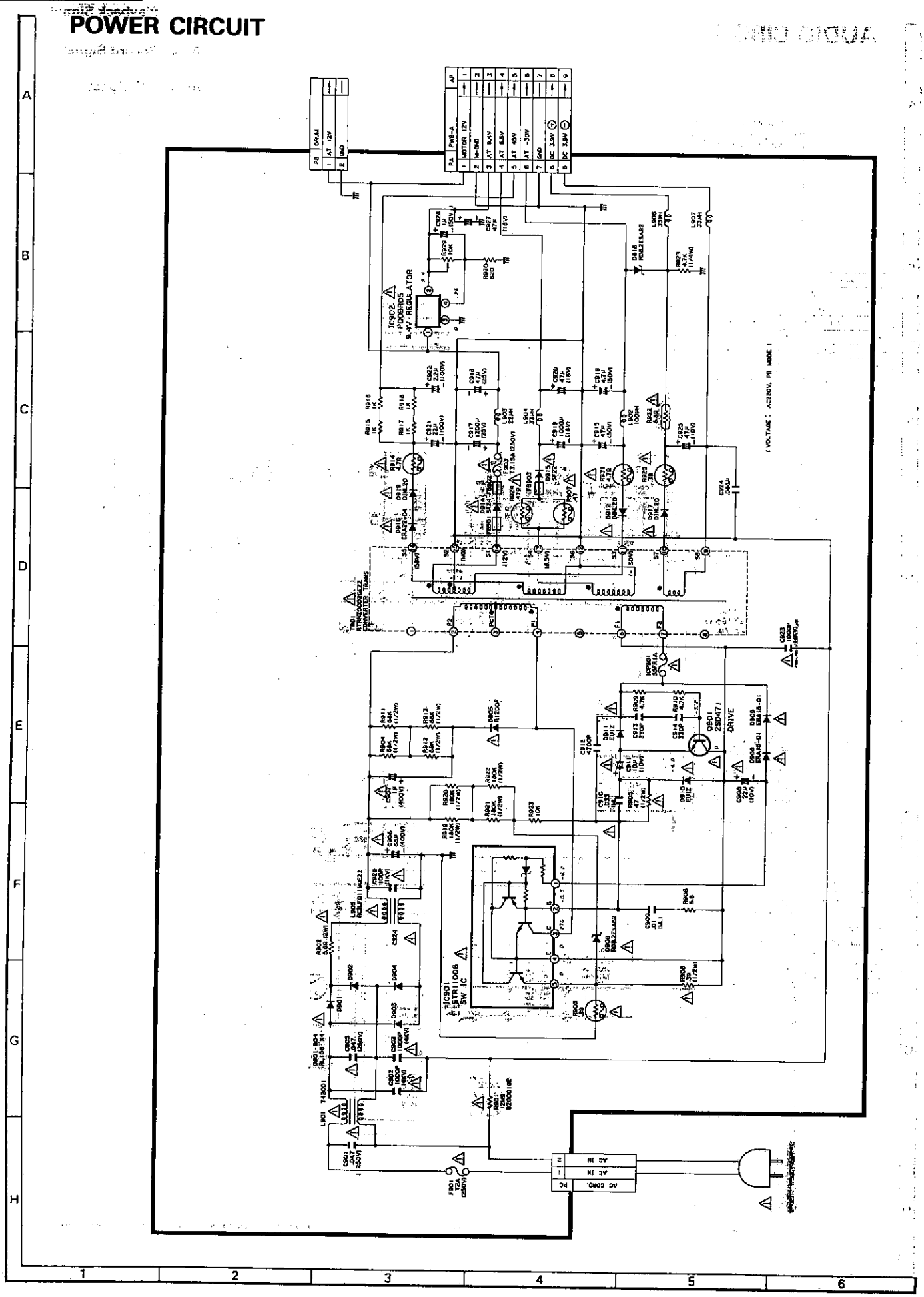
Audio E-E Signal

RUNTK0526GEZZ

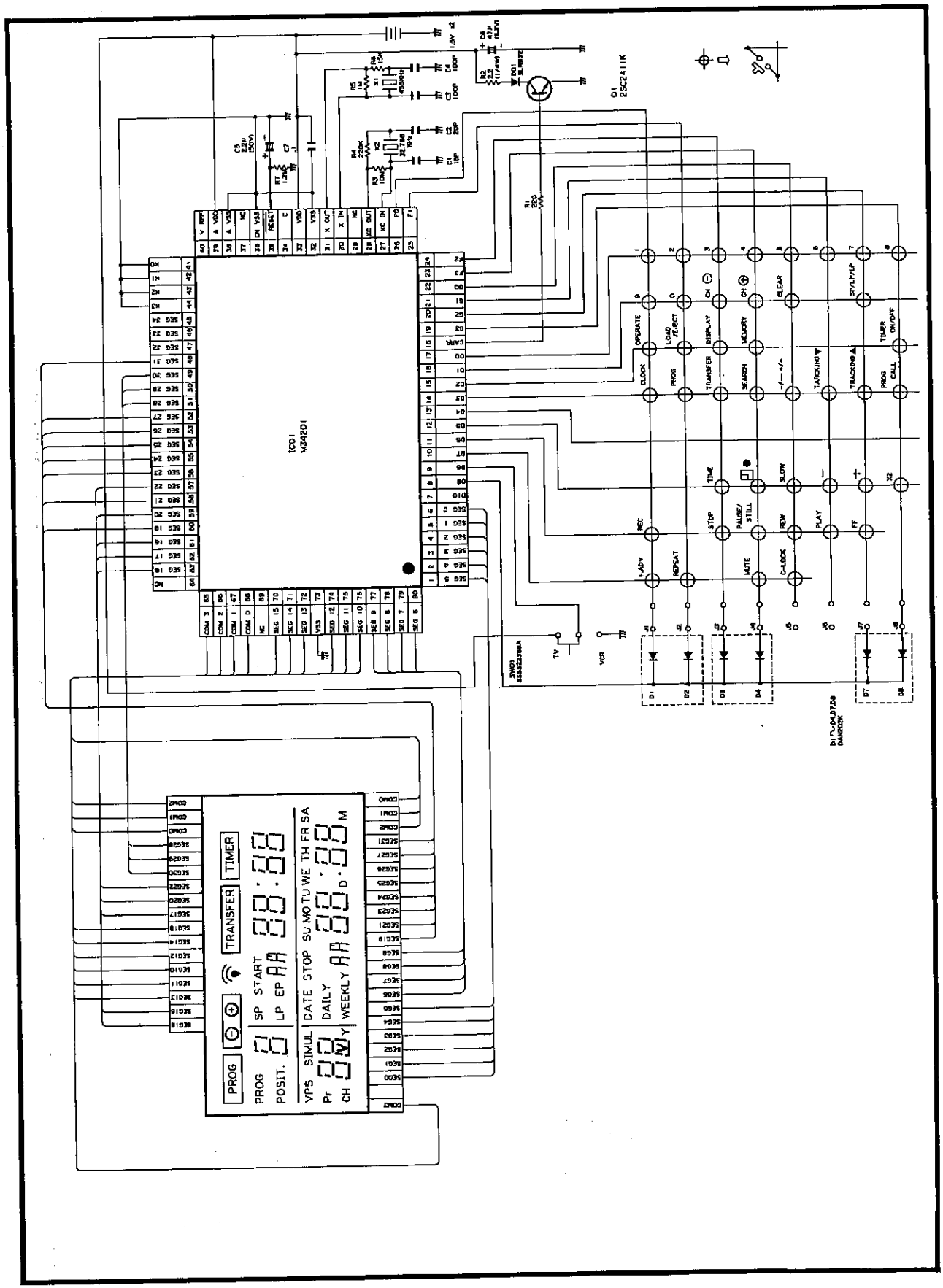
Printed Resistor Circuits



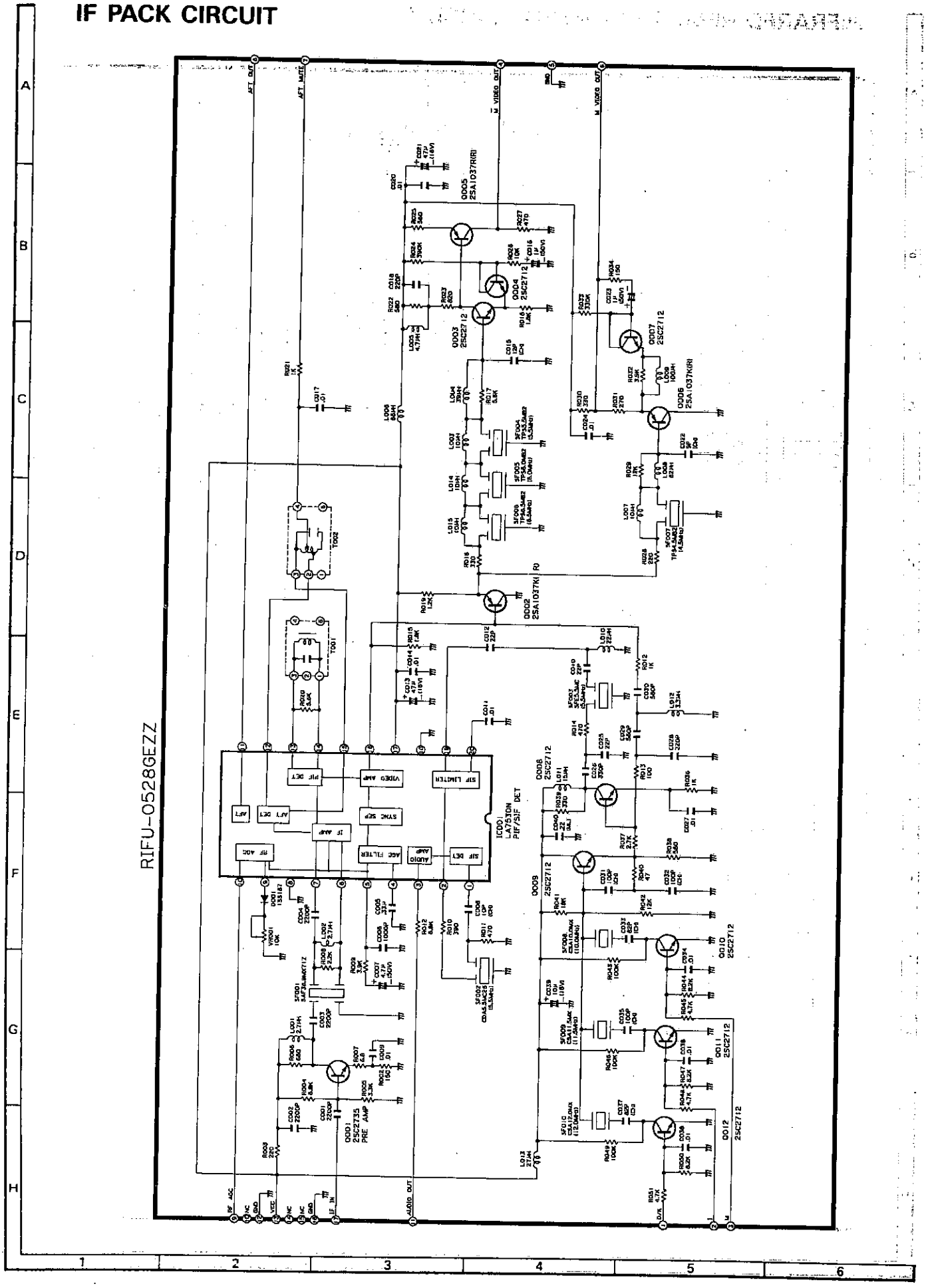
POWER CIRCUIT



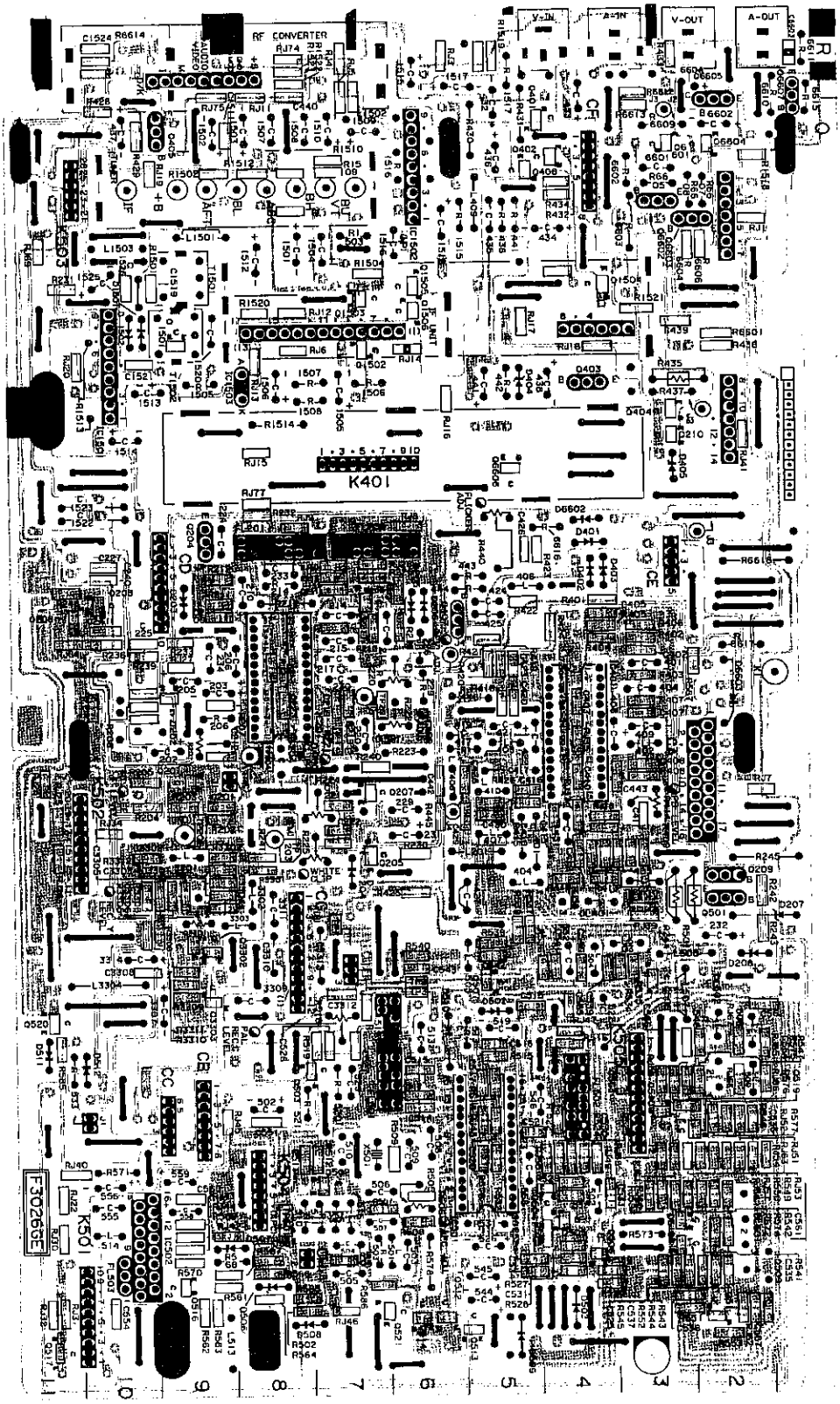
INFRARED REMOTE CONTROL CIRCUIT

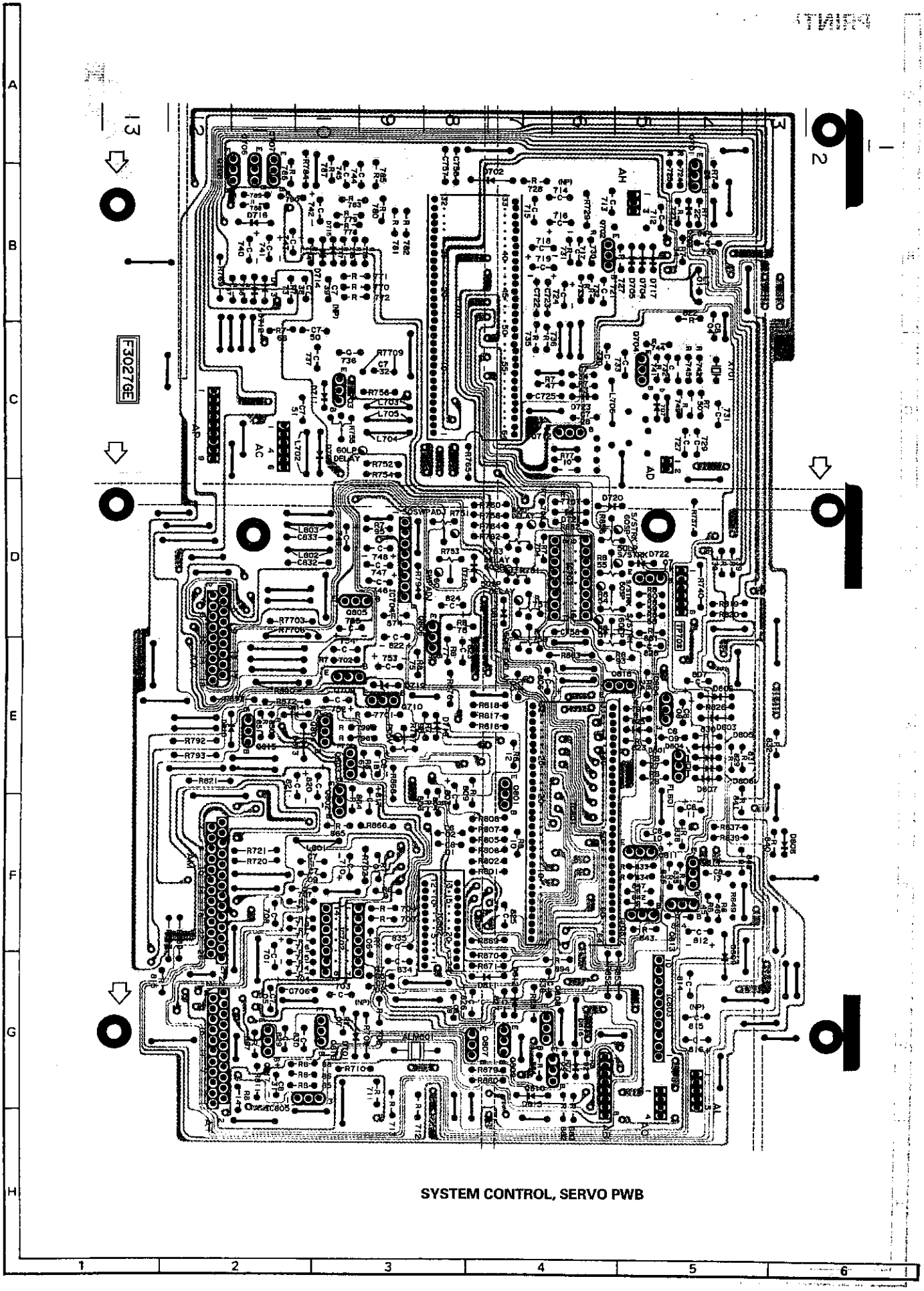


IF PACK CIRCUIT

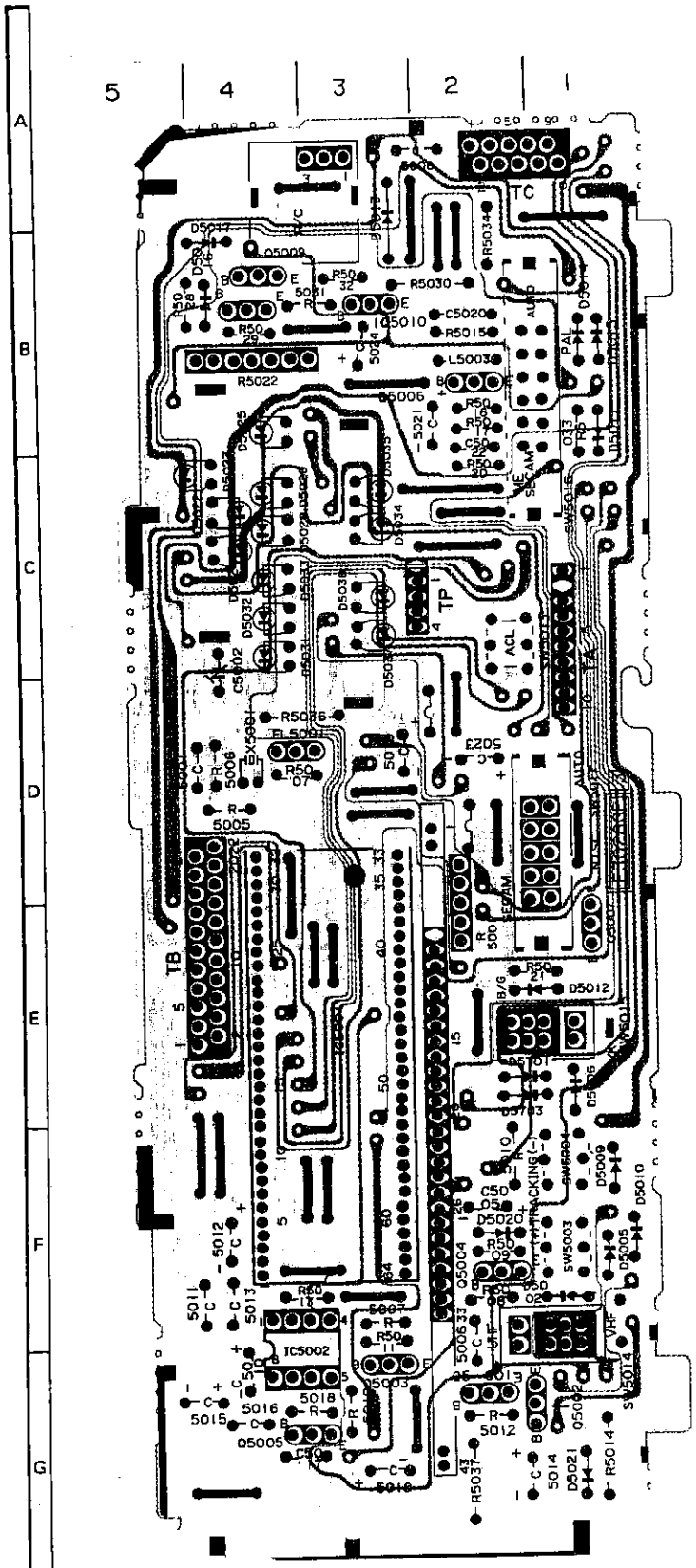


PRINTED WIRING BOARD ASSEMBLIES





SYSTEM CONTROL, SERVO PWB


TC
TP
TB
IC5002
R5030
R5022
R5026
R5006
R5037
R5014
R5012
C5020
L5003
D5012
D5020
D5010
D5009
D5005
D5021
SW5003
SW5004
SW5005
SW5006
SW5007
SW5008
SW5009
SW5010
SW5011
SW5012
SW5013
SW5014
SW5015
SW5016
TRACKING(-)
VHF
PAL
SECAM
AUTO
ACL
EE/AM
B/G
I/I'
D/K
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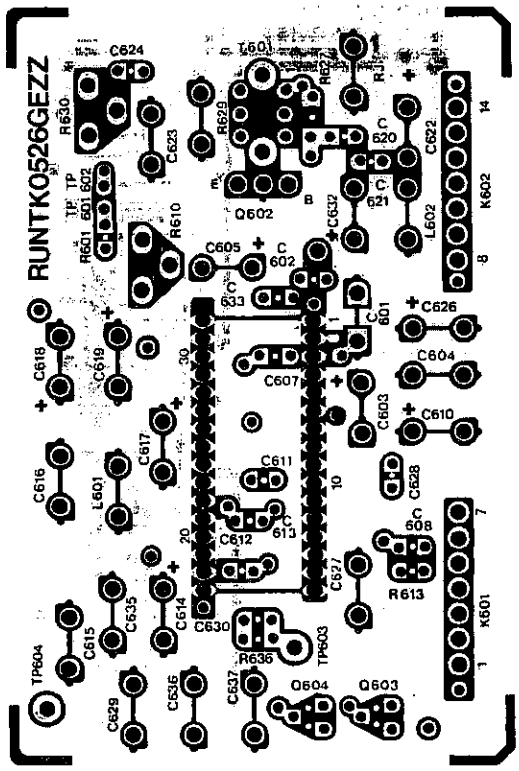
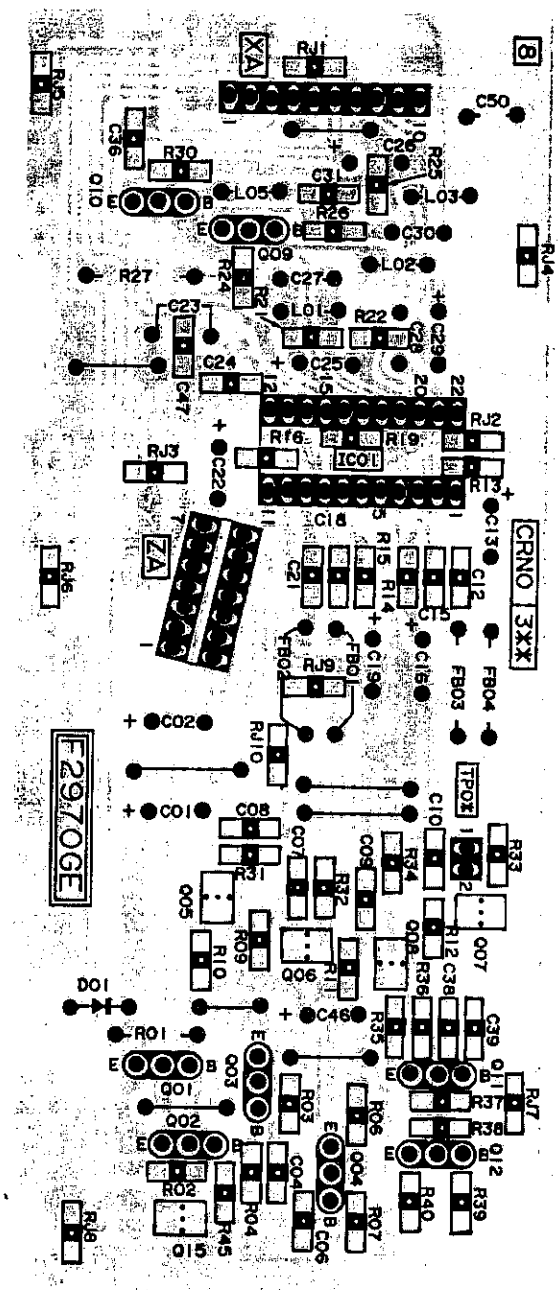
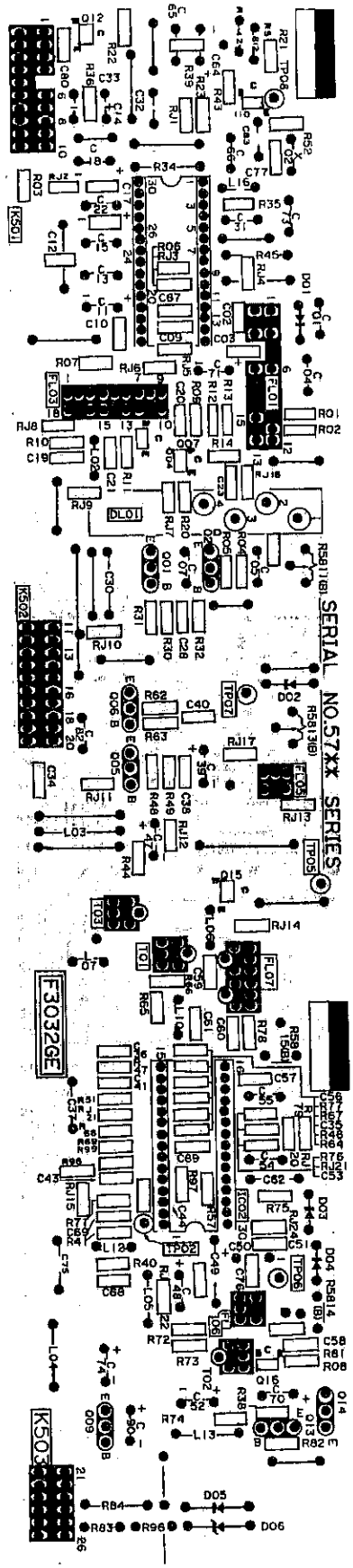


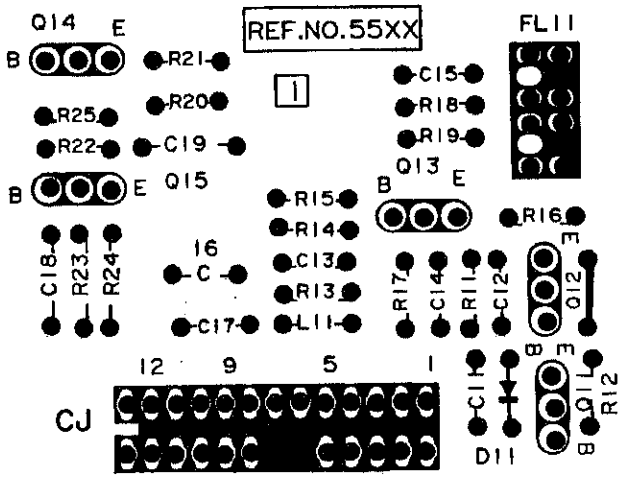
AUDIO PWB



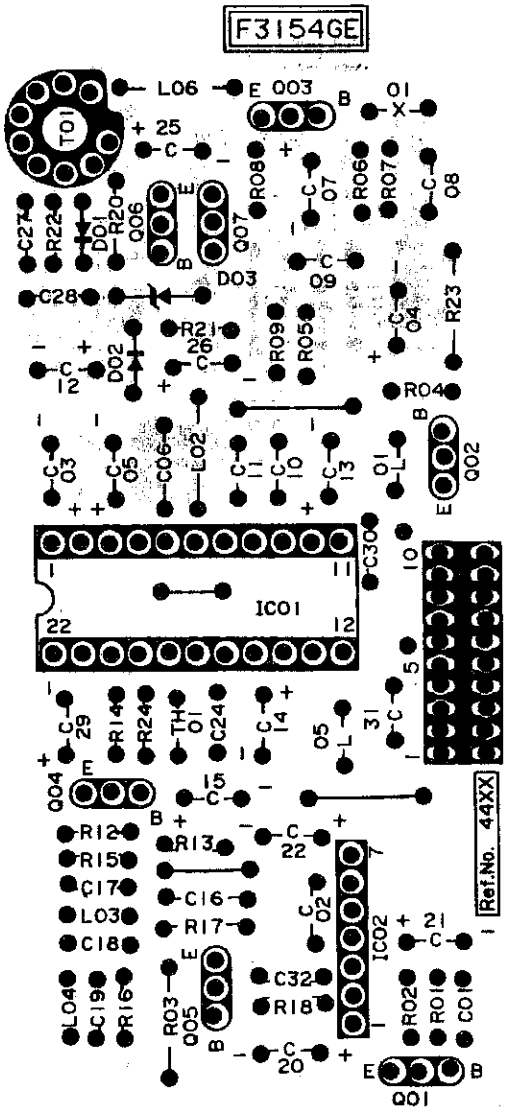
HEAD AMP PWB



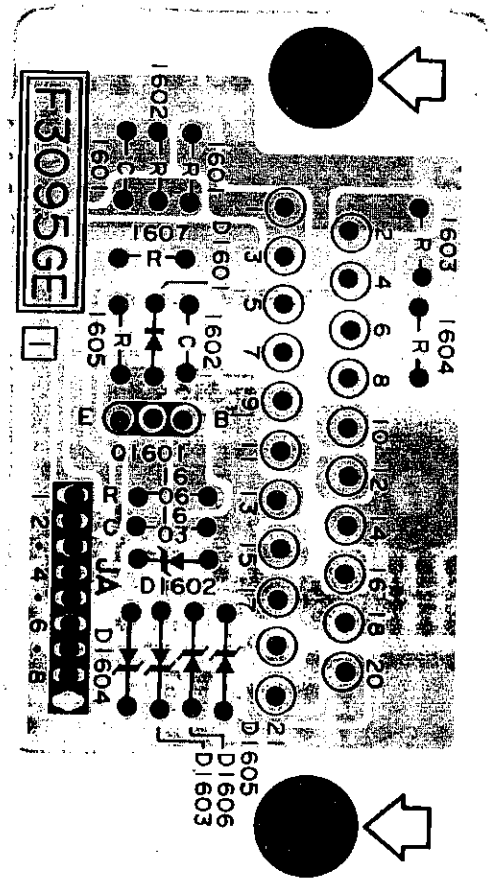
SUB CHROMA PWB



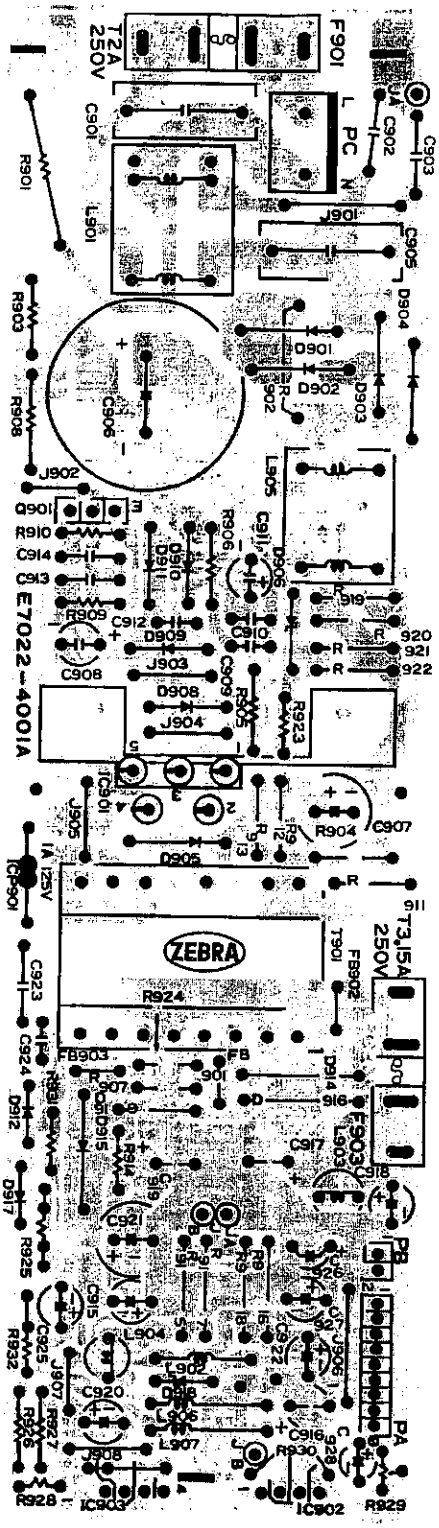
PAL SKEW CONTROL PWB



NTSC SKEW CONTROL PWB



21 PIN JACK PWB



POWER PWB

REPLACEMENT PARTS LIST

PARTS REPLACEMENT

Many electrical and mechanical parts in video cassette recorder have specila safety-related characteristics. These characteristics are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this manual; electrical components having such features are identified by ⚠ and shaded areas in the Replacement Parts Lists and Schematic Diagrams. The use of a substitute replacement part which does not have the same safety characteristics as the factory recommended replacement parts shown in this service manual may create shock, fire or other hazards.

"HOW TO ORDER REPLACEMENT PARTS"

To have your order filled promptly and correctly, please furnish the following informations.

1. MODEL NUNBER **2. REF. NO.**
3. PART NO. **4. DESCRIPTION**
5. PRICE CODE

⚠ MARK:SAFETY RELATED PARTS

PWB ASSEMBLY IS NOT REPLACEMENT ITEM

REF.NO.	PART NO.	DESCRIPTION	CODE
MAIN CIRCUIT			
PWB-A	DUNTK3026TM51	Main Bord Assembly	—
TRANSISTORS			
Q 201, 502, 503, 504, 505, 506, 509, 510, 511, 516, 518, 1501	VS2SC2412 KQ - 1	2SC2412KQ	AA
Q 202, 203, 205, 207, 210, 404, 517, 521, 1502, 1503, 1504, 1505, 1506, 3303, 6601, 6606	VSDTC144 EK / - 1	DTC144EK	AB
Q 204, 403,	VS2SC1815YW - 1	2SC1815YW	AC
Q 206, 401, 402, 507, 508, 3301, 3302	VS2SA1037 KQ - 1	2SA1037KQ	AA
Q 208, 6604	VSDTA144 EK / - 1	DTA144EK	AC
Q 209, 501, 6602, 6603, 6605	VS2SD655 - DE 1E	2SD655	AC
Q 407	VS2C1740 SQ R1E	2SC1740SQR	AC
Q 408	VSDTC124 EK / - 1	DTC124EK	AB
Q 409	VS2SA933 SQR 1E	2SA933SQR	AB
Q 410, 6607	VSDTA144 ES / - 1	DTA144ES	AB
INTEGRATED CIRCUITS			
IC201	VHi AN3215NK - 1		AP
IC401	VHi AN3321K / - 1		AR
IC501	VHi TA8644N / - 1		AP
IC502	VHi BA7007 / / - 1		AM
IC1501	RH - i X0203GEZZ		AE
IC1502	VHi TA7348P / - 1		AK
IC1503	RH - i X0037CEZZ or VH i UPC574JT - 1		AF / AC
DIODES AND CRYSTAL			
D 201, 203, 204, 205, 206, 208, 401, 402, 403, 405,	RH - DX0048GEZZ	1N4531	AA

REF.NO.	PART NO.	DESCRIPTION	CODE
406, 502, 503, 506, 507, 508, 509, 510, 511, 512, 6602, 6603			
D 207, 404	RH - EX0374GEZZ	HZS6B1/TA	AA
D 1501, 1502	VHD1SS152 / / - 1	1SS152	AB
X 501	RC RSB 0002CEZZ	Crystal	AM

CONTROLS

R 201, 224, 225, 414	RVR - M4419GEZZ	47k (B) E-E level adj. 47k (B) Dark clip adj. 47k (B) White clip adj. 47k (B) Playback level adj.	AB
R 220, 222	RVR - M4415GEZZ	10k (B) Deviation adj. 10k (B) Carrier adj.	AB
R 440	RVR - B4338GEZZ	2.2k (B) Flicker adj.	AC
R 506	RVR - M4380GEZZ	100k (B) APC adj.	AC
R 518	RVR - M4411GEZZ	2.2k (B) PAL Rec. C level adj.	AB
R 3304	RVR - M4409GEZZ	1k (B) Rec. Y level adj.	AB

COILS AND TRANSFORMERS

DL401	RC i L Z0199GEZZ	Delay line	AM
DL501	RC i L Z0292GEZZ	Delay line	AP
DL502	RC i L Z0293GEZZ	Delay line	AP
FL503	RF i LC0029 TAZZ	Filter	AD
L 202	VP - M K470K0000	47µH	AB
L 401	VP - D F101K0000	100µH	AB
L 402, 403	VP - X F121K0000	120µH	AB
L 404, 405	VP - X F120K0000	12µH	AB
L 406, 3302	VP - X F680K0000	68µH	AB
L 407, 3301, 3303	VP - X F151K0000	150µH	AB
L 408	VP - X F150K0000	15µH	AB
L 409, 513, 1502, 3304	VP - D F221K0000	220µH	AB
L 410	VP - X F820K0000	82µH	AB
L 501	VP - X F180K0000	18µH	AB
L 502	VP - X F390K0000	39µH	AB
L 503, 504, 515	VP - X F221K0000	220µH	AB
L 505	VP - M K561K0000	560µH	AB
L 506	VP - D F271K0000	270µH	AB
L 514	VP - Y F153J0000	15mH	AC
L 1503	VP - D F680K0000	68µH	AB
T 1501	RC i L i 0085GEZZ	Trap coil	AD
T 1502	RC i L i 0084GEZZ	Trap coil	AD

CAPACITORS

C 218, 230, 508	VCF YHA 1HA104J	0.1µF, 50V, 5%, Mylar	AB
C 231, 438	VCEAGA1AW227M	220µF, 10V, 20%, Electrolytic	AB
C 234	VCF YHA 1HA334J	0.33µF, 50V, 5%, Mylar	AC
C 433, 434	VCE ADA0JW477M	470µF, 6.3V, 20%, Electrolytic	AB
C 504	RC - QZA392TAYJ	3900pF, 50V, 5%, Mylar	AB
C 506	RC - QZA222TAYJ	2200pF, 50V, 5%, Mylar	AB
C 555, 6601	RC - QZA273TAYJ	0.027µF, 50V, 5%, Mylar	AB
C 568	VCF YHA 1HA393J	0.039µF, 50V, 5%, Mylar	AB
C 1507, 1508	VCF YSA1J A334J	0.33µF, 63V, 5%, Mylar	AB
C 1512	VCEAGA1CW337M	330µF, 16V, 20%, Electrolytic	AC
C 1516	VCE 9EA1CW226M	22µF, 16V, 20%, Electrolytic (N.P.)	AC
C 3307	VCE 9EA1HW105M	1.0µF, 50V, 20%, Electrolytic (N.P.)	AC

RESISTOR

R 244, 501	VRG - RT2EB2R2J	2.2 ohm, 1/4W, 5%, Fusible resistor	AB

REF.NO.	PART NO.	DESCRIPTION	CODE
MISCELLANEOUS			
	Ri FU - 0528GEZZ	IF Pack	BC
	RC NV R0042GEZZ	RF Converter	BD
	VT UVTSA6S2Z / /	Tuner	BG
	RU NT K0526GEZZ	Audio Unit	—
	QJ AK E0054GEZZ	Jack, Video In	AC
	QJ AK E0100GEZZ	Jack, Video Out	AH
	QJ AK E0101GEZZ	Jack, Audio Out	AH
	QJ AK E0106GEZZ	Jack, Audio In	AB
	QPLG N0278GEZZ	Plug, 2 pin (CH)	AA
	QPLG N0328 TAZZ	Plug, 3 pin (TP)	AD
	QPLG N0578GEZZ	Plug, 5 pin (CE)	AB
	QPLG N0678GEZZ	Plug, 6 pin (CC)	AB
	QPLG N0679GEZZ	Plug, 6 pin (K503)	AB
	QPLG N0878GEZZ	Plug, 8 pin (CB, CF)	AC
	QPLG N1078GEZZ	Plug, 10 pin (CD, CG)	AC
	QPLG N1079GEZZ	Plug, 10 pin (K501, 502)	AB
	QPLG N1279GEZZ	Plug, 12 pin (K505)	AC
	QS ô CN1894GEZZ	Socket, 18 pin (CA)	AD
FL201	RM PTD0219GEZZ	Packaged circuit	AG
FL202	RM PTD0220GEZZ	Packaged circuit	AK
FL501	RM PTD0239GEZZ	Packaged circuit	AG
FL502	RM PTD0221GEZZ	Packaged circuit	AK
SYSCON SERVO CIRCUIT			
	DUNTK3027HE51	Syscon Servo Board Assembly	—
TRANSISTORS			
Q 701, 702, 707, 714, 803, 807	VS2SA933 SQ R1E	2SA933SQR	AB
Q 703, 808, 809, 818	VSDTA124 ES / - 1	DTA124ES	AB
Q 704, 710, 801, 810, 811, 812, 813, 814, 816, 817	VS2C1740 SQ R1E	2SC1740SQR	AC
Q 708, 713	VSDTC144 ES / - 1	DTC144ES	AB
Q 709	VS2SD468 - C/ - 1	2SD468	AD
Q 802	VS2SA1271 - Y - 1	2SA1271	AB
Q 805	VS2SB 1117 KU1E	2SB1117KU	AE
Q 815	VS2SC2001 LK - 1	2SC2001LK	AA
INTEGRATED CIRCUITS			
IC701	RH - i X0522GEZZ		AT
IC702	VH i i R3702 / /- 1		AF
IC703	VHi BU4052B / - 1		AE
IC801	RH - i X0485GEZZ		AW
IC802	RH - i X0479GEZZ		AL
IC803	VHi BA6209 / / - 1		AK
IC804	VHi PST529 H2 - 1		AD
DIODES AND CRYSTAL			
D 701, 702, 703, 704, 705, 707, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 723, 724, 725, 801, 802, 803, 805, 807, 808, 809, 811, 812,	RH - DX0048GEZZ	1N4531	AA

REF.NO.	PART NO.	DESCRIPTION	CODE
814, 815, 816, 817			
D 719	RH - EX0123GEZZ	HZS3.6EB1	AA
D 810	RH - DX0052GEZZ	ERA15-02	AB
D 813	RH - EX0135GEZZ	HZS5.1EB3	AA
X 701	RC RS B0009GEZZ	Crystal	AL
CONTROLS			
R 751	RVR - M4421GEZZ	100k (B) 50Hz SW pulse adj.	AB
R 753	RVR - M4176GEZZ	680k (B) 60Hz SW pulse adj.	AB
R 755, 757, 759, 761, 763, 854, 855, 856, 857	RVR - M4423GEZZ	220k (B) 60Hz LP delay adj. 220k (B) 50Hz SP delay adj. 220k (B) 50Hz LP delay adj. 220k (B) 60Hz SP delay adj. 220k (B) 60Hz EP delay adj. 220k (B) 50Hz SP Slow/Still tracking adj. 220k (B) 50Hz LP Slow/Still tracking adj. 220k (B) 60Hz SP Slow/Still tracking adj. 220k (B) 60Hz LP Slow/Still tracking adj.	AB
R 797	RVR - M4409GEZZ	1k (B) PC5V adj.	AB
COIL AND FILTER			
FL801	R F i LC0091GEZZ	Filter	AD
L 706	VP - X F101K0000	100µH	AB
CAPACITORS			
C 703	VCE9 EA1CW106M	10µF, 16V, 20%, Electrolytic (N.P.)	AC
C 713	RC - QZA123TAYJ	0.012µF, 50V, 5%, Mylar	AB
C 714	VCE9 EA1CW226M	22µF, 16V, 20%, Electrolytic (N.P.)	AC
C 720, 815	VCE9 EA1HW105M	1.0µF, 50V, 20%, Electrolytic (N.P.)	AC
C 722	VCF YHA 1HA683J	0.068µF, 50V, 5%, Mylar	AB
C 730, 814, 819	RC - K Z0017GEZZ	0.047µF, 16V, +80%–20% Ceramic	AA
C 735, 757	VCF YHA 1HA473J	0.047µF, 50V, 5%, Mylar	AB
C 736	RC - QZA472TAYJ	4700pF, 50V, 5%, Mylar	AB
C 737	VCF YHA 1HA333J	0.033µF, 50V, 5%, Mylar	AB
C 739	VCE9 EA1HW225M	2.2µF, 50V, 20%, Electrolytic (N.P.)	AB
C 744	RC - QZA562TAYJ	5600pF, 50V, 5%, Mylar	AB
C 745	VCF YHA 1HA334J	0.33µF, 50V, 5%, Mylar	AC
C 760	VCF YHA 1HA104J	0.1µF, 50V, 5%, Mylar	AB
C 825	RC - QZA102TAYJ	1000pF, 50V, 5%, Mylar	AB
C 738, 828	VCF YHA 1HA124J	0.12µF, 50V, 5%, Mylar	AB
C 829	VCF YHA 1HA393J	0.039µF, 50V, 5%, Mylar	AB
C 830	VCF YHA 1HA563J	0.056µF, 50V, 5%, Mylar	AB
RESISTORS			
R 890, 7706	VRG - RT2EB2R2J	2.2 ohm, 1/4W, 5%, Fusible resistor	AB
MISCELLANEOUS			
	QPLG N0278GEZZ	Plug, 2 pin (AD)	AA
	QPLG N0378GEZZ	Plug, 3 pin (AH)	AB
	QPLG N0478GEZZ	Plug, 4 pin (Aõ)	AB
	QPLG N0578GEZZ	Plug, 5 pin (AL)	AB
	QPLG N0628TAZZ	Plug, 6 pin (TP)	AB
	QPLG N0678GEZZ	Plug, 6 pin (AC)	AB
	QPLG N0878GEZZ	Plug, 8 pin (AB)	AC
	QPLG N0978GEZZ	Plug, 9 pin (AP)	AC
	QS õ CN1894GEZZ	Socket, 18 pin (AA)	AD
	QS õ CN2294GEZZ	Socket, 22 pin (AT)	AD
	QS õ CN2794GEZZ	Socket, 27 pin (AM)	AD
ALM801	RA LMB0010GEZZ	Alarm	AD
OPERATION CIRCUIT			
	DUNTK3029HE51	Operation Board Assembly	—
DIODES			
D 8101	RH - PX0167GEZZ	LED	AB
D 8103, 8104, 8110, 8111, 8112, 8113, 8114	RH - DX0048GEZZ	1N4531	AA

REF.NO.	PART NO.	DESCRIPTION	CODE
CONTROLS			
R 8110	RVR - B4345GEZZ	200k (B) Vertical-Lock adj.	AC
R 8111	RVR - B4293GEZZ	20k (B) Picture tone adj.	AC
MISCELLANEOUS			
	QPLG N0478GEZZ	Plug, 4 pin (HB)	AB
	QS ō CN1094GEZZ	Socket, 10 pin (HA)	AC
SW8101,	QSW - K0052GEZZ	Switch, Power	AB
8102,		Switch, Eject	
8103,		Switch, Pause/Still	
8104,		Switch, REW	
8105,		Switch, Stop	
8106,		Switch, Playback	
8107,		Switch, Record	
8108,		Switch, FF	
8109,		Switch, Channel up	
8110,		Switch, Channel down	
8111		Switch, Record speed	
SW8112,	QSW - S0122GEZZ	Switch, Counter	AD
8113		Switch, Full auto	
TIMER CIRCUIT			
	DUNTK3028HE51	Timer Board Assembly	—
TRANSISTORS			
Q 5001,	VS2 SA1561Q / 1E	2SA1561Q	AC
5004			
Q 5002	VSDTC124 ELT - 1	DTC124EL	AA
Q 5003	VSDTC144 ELT - 1	DTC144EL	AB
Q 5005,	VS2SC4038 R / 1E	2SC4038R	AB
5008			
Q 5006	VS2C1740 SQ R1E	2SC1740SQR	AC
Q 5007	VSDTA124 ELT - 1	DTA124EL	AB
Q 5009	VSDTC143 ELT - 1	DTC143EL	AB
Q 5010	VS2SC2021 - R - 1	2SC2021(R)	AB
INTEGRATED CIRCUITS			
IC5001	RH - i X0486GEZZ		AX
IC5002	VHi MSM16905 - 1		AL

REF.NO.	PART NO.	DESCRIPTION	CODE
DIODES AND CRYSTAL			
D 5001,	RH - DX0048GEZZ	1N4531	AA
5002,			
5005,			
5006,			
5009,			
5010,			
5011,			
5012,			
5013,			
5014,			
5015,			
5016,			
5017,			
5020,			
5021			
D 5022,	RH - PX0134GEZZ	LED	AC
5023,			
5024,			
5028,			
5029,			
5034,			
5035			
D 5025	RH - PX0135GEZZ	LED	AC
D 5031,	RH - PX0159GEZZ	LED	AB
5032,			
5033			
D 5037,	RH - PX0158GEZZ	LED	AB
5038			
X 5001	RC RS B0059GEZZ	Crystal	AD
COIL AND FILTER			
FL5001	RF i LC0090 GEZZ	Filter	AD
L 5003	VP - X F100K0000	10µH	AB
TRIMMER			
C 5002	RTō - H1005 AEZZ	Oscillation adj.	AC
CAPACITORS			
C 5014	RC - E Z0114GEZZ	0.047µF, 5.5V, +80%–20%, Electrolytic	AG
C 5022	VCF YSG 1HA224J	0.22µF, 50V, 5%, Mylar	AD

REF.NO.	PART NO.	DESCRIPTION	CODE
	MISCELLANEOUS		
	RR MCU0037GEZZ	Infrared remote control unit	AL
	QPLG N0428TA ZZ	Plug, 4 pin (TP5001~5004)	AB
	QPLG N1080 GEZZ	Plug, 10 pin (TA)	AC
	QS ō CN1094 GEZZ	Socket, 10 pin (TC)	AC
	QS ō CN2295 GEZZ	Socket, 22 pin (TB)	AD
DG 5001	V VK12BT27GK - 1	Fluorescent display tube	AX
R 5001	RM PTC0107GEZZ	Packaged circuit	AB
R 5022	RM PTC0128GEZZ	Packaged circuit	AC
SW5003, 5004, 5013	QSW - K0052GEZZ	Switch, Tracking (+) Switch, Tracking (-) Switch, ACL	AB
SW5014, 5015	QSW - S0123GEZZ	Switch, VHF/UHF Switch, Tuner system	AD
SW5016	QSW - S0200GEZZ	Switch, Color mode 1	AE
SW5017	QSW - S0199GEZZ	Switch, Color mode 2	AD

HEAD AMP CIRCUIT

	DUNTK2970XM50	Head Amp Board Assembly	—
	TRANSISTORS		
Q 301, 302	VS2SD655 - DE 1E	2SD655	AC
Q 303, 304	VS2SA933 SQ R1E	2SA933SQR	AB
Q 305, 306, 307, 308	VS2SC2412 KQ - 1	2SC2412KQ	AA
Q 309	VS2SC1923 - ō 1E	2SC1923	AD
Q 310	VS2C1740 SQ R1E	2SC1740SQR	AC
Q 311	VS2 SA 1015Y / 1E	2SA1015Y	AC
Q 312	VS2SC1815YW - 1	2SC1815YW	AC
Q 315	VSDTC144EK / - 1	DTC144EK	AB
	INTEGRATED CIRCUIT		
IC 301	VHi AN3311K / - 1		AS
	DIODE		
D 301	RH - DX0048GEZZ	1N4531	AA
	COILS		
L 301	VP - X F270K0000	27µH	AB
L 302	VP - X F330J0000	33µH	AB
L 303	VP - X F180K0000	18µH	AB
L 305	VP - X F151K0000	150µH	AB
	CAPACITORS		
C 323	VCQY WA1HA473J	0.047µF, 50V, 5%, Mylar	AB
C 350	VCF YHA 1HA104J	0.10µF, 50V, 5%, Mylar	AB
	MISCELLANEOUS		
	QPLG N0229 TAZZ	Plug, 2 pin (TP31, 32)	AB
	QPLG N1080 GEZZ	Plug, 10 pin (XA)	AC
	QS ō CN0732 REZZ	Socket, 7 pin (ZA)	AC

SUB CHROMA CIRCUIT

	DUNTK3032TM50	Sub Chroma Board Assembly	—
	TRANSISTORS		
Q 5701, 5702, 5705, 5706	VS2C1740 SQ R1E	2SC1740SQR	AC
Q 5704, 5707, 5711	VS2SC2412 KQ - 1	2SC2412KQ	AA
Q 5709	VS2SD655 - DE 1E	2SD655	AC
Q 5712, 5715	VSDTC144 EK / - 1	DTC144EK	AB
Q 5713, 5714	VS2SA733 A PQ1E	2SA733APQ	AC
Q 5716	VS2SA1037 KQ - 1	2SA1037KQ	AA
	INTEGRATED CIRCUITS		
IC 5701	VHi TA8644N / - 1		AP
IC 5702	VHi BA7107S / - 1		AS
	DIODES		
D 5701, 5702, 5703, 5704, 5705	RH - DX0048GEZZ	1N4531	AA

REF.NO.	PART NO.	DESCRIPTION	CODE
D 5706	RH - EX0135GEZZ	HZS5.1EB3	AA
X 5702	RC RSB0009 GEZZ	Crystal	AL
CONTROLS			
R 5811	RVR - B5443CEZZ	2k (B) NTSC record C level adj.	AB
R 5812	RVR - M4380GEZZ	100k (B) APC adj.	AC
R 5813	RVR - B5442CEZZ	1k (B) SECAM record C level adj.	AB
R 5814	RVR - B5446CEZZ	10k (B) Gate 1 adj.	AB
R 5815	RVR - M4414GEZZ	6.8k (B) Gate 2 adj.	AB
COILS AND TRANSFORMERS			
DL5701	RC i LZ 0208GEZZ	Delay line	AN
L 5702	VP - X F470K0000	47µH	AB
L 5703	VP - D F101K0000	100µH	AB
L 5704	VP - D F271K0000	270µH	AB
L 5705	VP - X F101K0000	100µH	AB
L 5706, 5712	VP - X F221K0000	220µH	AB
L 5707	VP - MK471K0000	470µH	AB
L 5710	VP - X F390K0000	39µH	AB
L 5713	VP - D F391K0000	390µH	AC
L 5716	VP - X F180K0000	18µH	AB
T 5701, 5702	RC i LV 0013GEZZ	Coil	AF
T 5703	RC i LV 0015GEZZ	Coil	AF
CAPACITORS			
C 5713, 5766	RC - K Z0011GEZZ	0.10µF, 25V, +80%–20%, Ceramic	AA
C 5715	VCF YHA 1HA473J	0.047µF, 50V, 5%, Mylar	AB
C 5722	VCEAEA1CW107M	100µF, 16V, 20%, Electrolytic	AC
C 5732	RC - QZA392TAYJ	3900pF, 50V, 5%, Mylar	AB
C 5754	RC - QZA471TAYJ	470pF, 50V, 5%, Mylar	AB
C 5755	RC - QZA682TAYJ	6800pF, 50V, 5%, Mylar	AB
C 5765	RC - QZA222TAYJ	2200pF, 50V, 5%, Mylar	AB
RESISTOR			
R 5784	VRG - RF2EB2R7J	2.7 ohm, 1/4W, 5%, Fusible resistor	AB

REF.NO.	PART NO.	DESCRIPTION	CODE
MISCELLANEOUS			
	QS ō CN0679 GEZZ	Socket, 6 pin (K503)	AC
	QS ō CN1079 GEZZ	Socket, 10 pin (K501, 502)	AC
FL5701	RM PTD0224GEZZ	Packaged circuit	AG
FL5703	RM PTD0222GEZZ	Packaged circuit	AK
FL5705	RM PTD0223GEZZ	Packaged circuit	AE
FL5706	RM PTD0257GEZZ	Packaged circuit	AD
FL5707	RM PTD0149GEZZ	Packaged circuit	AH
PAL SKEW CIRCUIT			
	DUNTK3094HE50	PAL Board Assembly	—
TRANSISTORS			
Q 5511, 5513, 5514, 5515	VS2C1740 SQ R1E	2SC1740SQR	AC
Q 5512	VSDTC144 ES / - 1	DTC144ES	AB
DIODE AND COIL			
D 5511	RH - DX0048GEZZ	1N4531	AA
L 5511	VP - X F220K0000	22µH	AB
MISCELLANEOUS PARTS			
	QS ō CN1279 GEZZ	Socket, 12 pin (K504)	AC
FL5511	RM PTD0339GEZZ	Packaged circuit	AF
21 PIN JACK CIRCUIT			
	DUNTK3095HE50	21 Pin Jack Board Assembly	—
TRANSISTOR			
Q 1601	VS2C1740 SQ R1E	2SC1740SQR	AC

REF.NO.	PART NO.	DESCRIPTION	CODE
DIODES			
D 1601	RH - DX0048GEZZ	1N4531	AA
D 1602	RH - EX0163GEZZ	HZS12EB3	AA
D 1603, 1604, 1605, 1606	RH - EX0168GEZZ	HZS15EB2	AA
MISCELLUNEOUS PART			
	QS ō CZ 2121GEZZ	Socket, 21 pin	AF
	QPLG N0878GEZZ	Plug, 8 pin (JA)	AC
NTSC SKEW CONTROL CIRCUIT			
	DUNTK3154TM50	NTSC Skew Control Board, Assembly	—
TRANSISTORS			
Q 4401, 4405	VS2SA933 SQ R1E	2SA933SQR	AB
Q 4402, 4403, 4404	VS2C1740 SQ R1E	2SC1740SQR	AC
Q 4406	VS2SC2001 LK - 1	2SC2001LK	AA
Q 4407	VS2SC1815YW - 1	2SC1815YW	AC
INTEGRATED CIRCUITS			
IC4401	VHi TL8605 P / - 1		AW
IC4402	VHi TA7347 P / - 1		AG
DIODES AND CRYSTAL			
D 4401, 4402	RH - DX0048GEZZ	1N4531	AA
D 4403	RH - EX0159GEZZ	HZS11EB2	AA
X 4401	RC RSB 0103GEZZ	Crystal	AG
COILS AND TRANSFORMER			
L 4401	VP - M K221K0000	220µH	AB
L 4402	VP - D F101K0000	100µH	AB
L 4403	VP - X F220K0000	22µH	AB
L 4404	VP - X F330K0000	33µH	AB
L 4405	VP - M K680K0000	68µH	AB
L 4406	VP - D F221K0000	220µH	AB
T 4401	RT RN H0065GEZZ	Oscillator transformer	AF

REF.NO.	PART NO.	DESCRIPTION	CODE
CAPACITORS			
C 4403	VCE 9EA1HW474M	0.47µF, 50V, 20%, Electrolytic (N.P.)	AB
C 4412, 4422, 4425	VCEA EA1CW107M	100µF, 16V, 20%, Electrolytic	AC
C 4415	VCE 9EA1CW106M	10µF, 16V, 20%, Electrolytic (N.P.)	AC
C 4431	VCF YHA 1HA104J	0.1µF, 50V, 5%, Mylar	AB
RESISTOR			
R 4423	RR - X Z0037TAZZ	4.7 ohm, 1/4W, Fusible resistor	AB
MISCELLANEOUS			
	QS ō CN1079GEZZ	Socket, 10 pin (K401)	AC
TH4401	VHHNTH5D152 - 1	Thermistor	AC
AUDIO CIRCUIT			
	RUNTK0526GEZZ	Audio Board Assembly	—
TRANSISTORS			
Q 602	VS2SC3939 QR - 1	2SC3939QR	AD
Q 603, 604	98M2SD601AR / /	2SD-601AR	AB
INTEGRATED CIRCUIT			
IC601	VHi BA7765AS - 1		AL
CONTROLS			
R 610	RVR - B5446CEZZ	10k (B) Playback level adj.	AB
R 630	RVR - B5453CEZZ	500k (B) Bias control adj.	AB
COILS AND TRANSFORMER			
L 601	VP - Y F822J0000	8.2mH	AC
L 602	VP - Z K221K0000	220µH	AB
T 601	RT RNH0053GEZZ	Oscillator transformer	AE
CAPACITORS			
C 601	VCQYTA 1HM122J	1200pF, 50V, 5%, Mylar	AA
C 604	VCQYTA 1HM123J	0.012µF, 50V, 5%, Mylar	AA
C 610	VCEAAA1AW107M	100µF, 10V, 20%, Electrolytic	AB

REF.NO.	PART NO.	DESCRIPTION	CODE
C 615	VCQYTA 1HM273J	0.027µF, 50V, 5%, Mylar	AB
C 616, 629	VCQYTA 1HM682J	6800pF, 50V, 5%, Mylar	AB
C 623	VCQ PSA2HA562J	5600pF, 100V, 5%, Mylar	AB
C 627	VCEANA1HW105M	0.1µF, 50V, 20%, Electrolytic	AC
C 635	VCQYTA 1HM472J	4700pF, 50V, 5%, Mylar	AB
C 636	VCQYTA 1HM183J	0.018µF, 50V, 5%, Mylar	AB
MISCELLANEOUS			
	QPLG N0229 TAZZ	Plug, 2 pin (TP601, 602)	AB
	QPLG Z0707 GEZZ	Plug, 7 pin (K601, 602)	AB
POWER CIRCUIT			
	CDENC0341GE00	Power Board Assembly	—
TRANSISTOR			
⚠Q 901	95 KUA D0038 AZ	2SD471	AF
INTEGRATED CIRCUITS			
⚠IC901	95 KUC Z0121 ZZ	STR11006	AT
⚠IC902	95 KUC B 0029 AZ	PQ09R05	AK
DIODES			
⚠D 901, ⚠ 902, ⚠ 903, ⚠ 904	95 KUB C0213 FZ	RL156	AC
⚠D 905	95 KUB C0214 BZ	R1200F	AC
⚠D 906	95 KUB DAC8R2C	RD8.2ESAB2	AB
	or		
	95 KUB D0442 CZ	RD8.2ESB2	AB
⚠D 908, ⚠ 909	95 KUB C0125 AZ	ERA15-01	AB
⚠D 910, ⚠ 911	95 KUB C0143 AA	EU1Z	AD
⚠D 912, ⚠ 917, ⚠ 919	95 KUB C0178 AZ	D1NL20	AD
⚠D 914	95 KUB C0212 BZ	SF24	AE
⚠D 915	95 KUB C0212 AZ	SF22	AE
⚠D 916	95 KUB C0169 BZ	ERA22-04	AD
D 918	95 KUB DAC8R2C	RD8.2ESAB2	AB
CONTROL			
R 929	95 KUF BA103 CB	10k (B) All time 24V adj.	AC
COILS AND TRANSFORMER			
⚠L 901	95 KUK Z0112 ZZ	Line filter	AL
L 902	95 KU KZ0256 ZZ	100µH	AC
L 903	95 KU K Z0251 ZZ	22µH	AE
L 904	95 KU K Z0257 ZZ	33µH	AE
⚠L 905	RC i LF0119 GEZZ	Line filter	AH
L 906, 907	95 KU K Z0258 ZZ	33µH	AC
⚠T 901	RT RNZ0002 GEZZ	Converter trans	AQ
CAPACITORS			
⚠C 901, ⚠ 905	95 KUG FZ473 BF	0.047µF, 250V, Mylar	AG
⚠C 902, ⚠ 903	95 KUG CZ102 BC	1000pF, 4kV, Ceramic	AE
⚠C 906	95 KUG BQ680AK	6.8µF, 400V, Electrolytic	AN
⚠C 907	95 KUGAQ010 BM	1.0µF, 400V, Electrolytic	AP
⚠C 908	95 KUGA B220GT	22µF, 10V, Electrolytic	AE
C 909	95 KUG F F103AR	0.1µF, 50V, Mylar	AB
⚠C 910	95 KUG F F333AR	0.033µF, 50V, Mylar	AB
⚠C 911	95 KUGA B100GT	10µF, 10V, Electrolytic	AE
⚠C 917	95 KUG AD122CW	1200µF, 25V, Electrolytic	AG
C 919	95 KUG AC102 BU	1000µF, 16V, Electrolytic	AE
C 921	95 KUGA J220 BU	22µF, 100V, Electrolytic	AD
C 922	95 KUGA J2R2 BU	2.2µF, 100V, Electrolytic	AB
C 923	95 KUG CZ102 BC	1000pF, 4kV, Ceramic	AE
C 929	95 KUG CZ101 AB	100pF, 1kV, Ceramic	AC
RESISTORS			
⚠R 901	95 KU E Z0085 ZZ	12M ohm, 1/2W, Solid	AE
⚠R 902	95 KUE FG5R6AA	5.6 ohm, 2W, Metal oxide	AD
⚠R 903, ⚠ 925	95 KUE BBR39 AF	0.39 ohm, 1/4W, Fusible resistor	AC
⚠R 905	95 KUE EC470 AL	47 ohm, 1/2W, Resistor	AA
⚠R 908	95 KUE FCR39 AK	0.39 ohm, 1/2W, Resistor	AA
⚠R 914, ⚠ 931	95 KUE BB4 R7AC	4.7 ohm, 1/4W, Fusible resistor	AC

REF.NO.	PART NO.	DESCRIPTION	CODE
⚠R 907,	95 KUE BBR47 AF	0.47 ohm, 1/4W,	AC
⚠ 924		Fusible resistor	
⚠R 932	95 KUZ Z 0031Z Z	6.8 ohm, 1/2W, Metal oxide	AF
MISCELLANEOUS			
⚠	Q ACCZ3005 GEZZ	AC Cord	AM
	or		
⚠	Q ACCV2024 GEZZ		AM
⚠F 901	95 K PJ C0473 ZZ	Fuse, T2A, 250V	AD
	or		
	95 K PJ C0178 ZZ		AD
⚠F 903	95 K PJ C0485 ZZ	Fuse, T3.15A, 250V	AD
	or		
	95 K PJ C0114 ZZ		AG
⚠ICP 901	95 K PJ C0282 ZZ	SSFR 1A, 125V	AG
PA	95 K EC B7313 ZZ	Plug, 9 pin	AH
PB	95 K PK Z0442 ZZ	Plug, 2 pin	AB
PC	95 K PK Z0194 ZZ	Plug, 2 pin	AC
INFRARED REMOTE CONTROL CIRCUIT			
	RRMCG0537GESA	Infrared Remote Control Unit	BD
TRANSISTOR			
Q 1	92 P3TSN0005T	2SC2411K	AD
INTEGRATED CIRCUIT			
IC01	92 P3 SQ00167	M34201M4-117FP	AY
DIODES AND CRYSTAL			
D 01	92 P3 QH00019	SLR932A-1-A (LED)	AE
D 1,	92 P3TSD0007T	DAN202K	AC
2,			
3,			
4,			
7,			
8,			
X 2	92 P3 EQ00010	32.768KHz (Crystal)	AH
COIL			
X 1	92 P3 E F00021	455KHz	AE

REF.NO.	PART NO.	DESCRIPTION	CODE
MISCELLANEOUS			
SW01	92PSSSS22388A	Switch, TV/VCR	AE
CABINET PARTS			
	92 PFA11D6803	Cabinet (A)	AM
	92 PFA11E1701	Cabinet (B)	AK
	92 PFA11D2101	Cabinet (C)	AD
	92 PFA58A6601	Filter	AE
	92 PFA42B2405	Rubber key	AT
	92 PFA42B0205	Rubber key	AH
	92 PFA61A8806	Button	AD
	92 PFA62B1738	Name plate (A)	AN
	92 PFA62A9709	Name plate (B)	AG
	92 P3ETFA9701	Battery terminal (A)	AC
	92 P3ETFA9801	Battery terminal (B)	AB
	92 P3ETFA9601	Battery terminal (C)	AB
	92 P2 A502100	Screw	AA
	92 P2 A391060	Screw	AA
	92 P3 ELFA048	LCD	AX
	92 P3ECFA0011	Connector	AF
	92 PFA23A5001	Spacer	AD
THE OTHER PARTS			
	QCNW -2304GEZZ	Connecting cord	AL
	TI NS - 1308GEZZ	Operation manual	AG
MECHANISM CHASSIS PARTS			
1	PG i DS0023GEFW	Retaining Guide	AE
2	MS PRC0142GEFJ	Retaining Guide Spring	AA
3	M LE VC0022GEZZ	Half-Loading Lever	AF
4	MS PRT 0270GEFJ	Half-Loading Lever Spring	AA
5	M LEVF0284GEFW	Half-Loading Drive Lever	AC
6	MS PRT 0269GEFJ	Half-Loading Reciprocating Spring	AA
7	M LEV F0283GEZZ	Half-Loading Reciprocating Lever	AB
8	MS PRC0144GEFJ	Azimuth Spring	AA
9	RH EDU0070GEZZ	Audio/Control Head Ass'y	AS
10	PCA P S1015GEZZ	Retaining Guide Cap	AA
11	QPW BF2888GEZZ	Audio/Control Head PWB	AB
12	M LEV F0292GEZZ	Audio/Control Head Arm	AD
13	MS PRD0087GEFJ	Audio/Control Head Arm Spring	AA
14	LH LD Z1606GEZZ	Loading Block Holder Ass'y	AC
15	Q P RBF2886GEZZ	Loading Block PWB	AD
16	RMō TM1049GEZZ	Loading Motor	AM
17	Q PLG N0529TAZZ	Plug, 5 pin (MG)	AB

REF.NO.	PART NO.	DESCRIPTION	CODE
18	Q SW- R0023GEZZ	Cam Switch	AF
19	NG ERW1032GEZZ	Worm Wheel	AC
20	N PLY V0133GEZZ	Loading Motor Pulley	AC
21	N BLT K0058GE00	Loading Belt	AA
22	NG ERW1031GEZZ	Worm Ass'y	AC
23	NS F TG0045GEFJ	Worm Shaft	AB
24	NGERH 1118GEZZ	Master Cam	AC
25	M LEV F0281GEZZ	Pinch Roller Lever Ass'y	AN
26	M LEV F0290GEZZ	Relay Shifter Lever	AE
27	M LE VC0023GEZZ	Reverse Guide	AG
28	MS PRD0086GEFJ	Reverse Guide Spring	AA
29	RM ōTN2019GEZZ	Capstan D.D. Motor	AZ
30	M LEV P0136GEZZ	Slow Brake Lever	AA
31	MS PRT0276GEFJ	Slow Brake Spring	AA
32	MS PRC0151GEFJ	Reverse Guide Spring	AA
33	M LEV F0289GEZZ	Relay Gear Drive Lever	AE
34	MSL i F0043GEZZ	Brake Shifter	AK
35	NS FT Z0068GEFD	Brake Lock Shaft	AC
36	MS PRC0143GEFJ	Absorber Plate Spring	AB
37	MS PRT0274GEFJ	Video Search Spring	AB
38	M LEV P0130GEZZ	Video Search Brake Lever	AD
39	M LEV P0131GEZZ	Video Search Reciprocating Lever	AC
40	RPLU - 0083GEZZ	Brake Solenoid Ass'y	AF
41	NDA i V1046GEZZ	Take-Up Reel Disk Ass'y	AG
42	NGERH 1128GEZZ	Idler Gear Ass'y	AN
43	N PLY V0134GEZZ	Reel Pulley	AC
44	MS PRD0085GEFJ	Shifter Spring	AB
45	PC ō VP1018GEZZ	Shifter Spring Cover	AC
46	LH LD P1092GEZZ	Cassette LED Holder	AE
47	RH - PX0169GEZZ	Cassette LED	AD
48	Q PWBF2977GEZZ	Reel Sensor PWB	AK
49	RH - PX0171GEZZ	Reel Sensor	AE
50	LCH S S0016GEZZ	Reel Block Chassis	AL
51	M LEV P0134GEZZ	Tension Adjusting Lever	AC
52	M LEV P0133GEZZ	Tension Release Lever	AC
53	M LEV P0132GEZZ	Back Tension Lever	AC
54	MS PRT0273GEFJ	Spring, Fast-Forward	AB
55	NDA i V1047GEZZ	Supply Reel Disk Ass'y	AH
56	MS PRT0272GEFJ	Main Brake Spring	AC
57	M LEV P0135GEZZ	Intermediate Lever	AC
58	M LEV P0129GEZZ	Main Take-Up Brake Lever	AE
59	M LEV P0128GEZZ	Main Supply Brake Lever	AE
60	NGERH 1121GEZZ	Loading Relay Gear	AA
61	MS PRT0271GEFJ	Loading Reciprocating Spring	AA
62	NGERH 1120GEZZ	Take-Up Loading Gear	AA
63	M LEV F0286GEZZ	Take-Up Loading Arm Ass'y	AC
64	NGERH 1119GEZZ	Supply Loading Gear	AA
65	M LEV F0285GEZZ	Supply Loading Arm Ass'y	AC
66	LC HSM0091GEZZ	Main Chassis Ass'y	AR
67	LB N DK1002GEZZ	Tension Band Ass'y	AD
68	LH LDZ 1607GEZZ	Tension Spring Hook Plate	AA
69	MS PRT0275GEFJ	Tension Spring	AA
70	M LEV F0291GEZZ	Tension Arm Ass'y	AF
72	MSL i F0042GEFW	Take-Up Pole Base Slider	AB
73	LP ō LM0033GEZZ	Take-Up Pole Base Ass'y	AG
74	NR ō LP0062GEZZ	Guide Roller Ass'y	AE
75	MSL i F0041GEFW	Supply Pole Base Slider	AB
76	LP ō LM0032GEZZ	Supply Pole Base Ass'y	AG
77	PG i DM0066GEZZ	Take-Up Loading Rail	AB
78	PG i DM0067GEZZ	Supply Loading Rail	AB
79	NSFT L0563GEFW	Supply Impedance Roller Innor	AC
80	PG i DH0031GEFW	Supply Impedance Roller Flange	AA
81	NR ō LP0056GEZZ	Supply Impedance Roller	AD
82	RH EDT 0026GEZZ	Full Erase Head Ass'y	AK
83	Q PWBF2936GEZZ	Full Erase Head PWB	AA
84	LA NGA 0054GEZZ	Supply Reel Stopper Ass'y	AD
85	N BLT K0059GE00	Reel Belt	AB
86	M LEV P0146GEZZ	Auxiliary Fast-Forward Brake Lever	AE
87	MS PRT0282GEFJ	Auxiliary Fast-Forward Brake Spring	AB
89	DDR MU0004HE22	Upper Drum Ass'y (VC-780E)	BL
89	DDR MU0004HE23	Upper Drum Ass'y (VC-790ET)	BN
90	PG i DC0039GEFW	Drum Base	AL
91	DDRM L0012HE00	Low Drum Ass'y (VC-780E)	BE
91	DDRM L0012HE02	Low Drum Ass'y (VC-790ET)	BG
92	Q BRS K0021GEZZ	Earth Brush Ass'y	AC
93	RM ōT P1099GEZZ	Drum D.D. Motor Ass'y	AW
94	RH E TP0015GEZZ	Heater	AG
96	Q CNW- 4880GEZZ	Full Flat Cable (Drum D.D. Motor)	AN
97	Q CNW- 5313GEZZ	Full Flat Cable (Capstan D.D. Motor)	AN
98	LH LDW1109GEZZ	Full Flat Cable Holder	AB
99	R DTCH 0018GEZZ	Dew Sensor	AG
100	Q S ōCN0534REZZ	Socket, 5 pin (MF)	AC
101	VRS - TW2ED221J	220 ohm, 1/4W, 5%, Oxide Film	AA
102	VCK YT V1HB102K	1000pF, 50V, 10%, Ceramic	AA
103	VRS - TV1J D473J	47k ohm, 1/ 16W, 5%, Oxide Film	AA
105	LA NGA0051GEFW	Take-Up Reel Disk Catch Holder	AB
106	PGi DS 0027 GEZZ	Supply Impedance Roller Flange (Low)	AA
110	PCA PS 1018GEZZ	Slow Brake Shaft Cap	AA
111	LA NG F7061GEZZ	Release Pin Angle Ass'y	AC

CASSETTE HOUSING CONTROL PARTS

REF.NO.	PART NO.	DESCRIPTION	CODE
	CH LDX3051GE00	Cassette Housing Control Assembly	AY
301	HDECQ 0558GESA	Cassette Cover	AG
302	PG i DM0069GE00	Down Guide	AC
303	Q SW- F0034GEZZ	Cassette Erase Protection Switch	AC
304	LH LDX 1008GE00	Cassette Housing Frame (R)	AF
305	MA RMP0038GEZZ	Cassette Cover Arm	AB
306	NG ERW1036GEZZ	Phase Gear	AA
307	MS PRD0088GEFJ	Drive Gear Spring (R)	AA
308	NG ERW1034GEZZ	Drive Gear (R)	AB
309	MS PRT0277GEFJ	Reciprocating Spring	AA
310	NG ERW1033GEZZ	Worm Wheel Gear	AB
311	M LEV P1042GE00	Open Lever	AA
312	MS PRD0091GEFJ	Open Lever Spring	AA
313	M LEV P0141GEZZ	Switching Lever	AA
314	MS PRT0280GEFJ	Switching Lever Spring	AA
315	Q SW- F0040GEZZ	Cassette Switch	AD
316	LA NGF9355GEFW	Worm Bracket	AB
317	NB RGP0013GEZZ	Bearing	AA
318	NS FT D0016GEZZ	Worm Shaft Ass'y	AE
319	M LEV P0140GEZZ	Clutch Lock Lever	AA
320	MS PRT0279GEFJ	Clutch Lock Lever Spring	AA
321	M LEV P0139GEZZ	Clutch Release Lever	AA
322	MS PRD0092GEFJ	Clutch Release Lever Spring	AA
323	M LEV P0138GEZZ	Clutch Lever	AA
324	N PLY V0135GEZZ	Pulley	AA
325	NB LT K0060GE00	Cassette Loading Belt	AB
326	LA NGF9354GEFW	Upper Plate	AD
327	LH LDX 1013GE00	Slider Holder (L)	AB
328	MS PRP0115GEFJ	Cassette Spring	AB
329	LA NGF9357GEFW	Slider Lock (L)	AA
330	MS PRT0281GEFJ	Slider Lock Spring	AA
331	MSLi F0044GEFW	Slider	AF
332	MA RMP0039GEZZ	Lock Release Lever Ass'y	AA
333	Q SW- F0037GEZZ	Auto Load Switch	AD
334	M LEV P0143GE00	Slider Lock Cover	AA
335	LA NGF9356GEFW	Slider Lock (R)	AA
336	LH LDX 1012GE00	Slider Holder (R)	AB
337	NG ERW1035GEZZ	Drive Gear (L)	AB
338	MS PRD0089GEFJ	Drive Gear Spring (L)	AA
339	LH LDX 1009GE00	Cassette Housing Frame (L)	AF
340	NS F TD0015GEFD	Main Shaft	AD
341	MS PRD0090GEFJ	Cassette Cover Spring	AA
342	Q PWBF3194GEZZ	Start Sensor PWB	AC
343	Q PWBF2894GEZZ	End Sensor PWB	AB
344	RH - PX 0053GEZZ	Phototransistor	AF
345	VS2SA937 - Q / -1	Transistor	AC
346	Q S öCN0595GEZZ	Socket, 5 pin	AB
347	VRD - RA2BE153J	15k ohm, 1/8W, 5%, Carbon	AA
348	VRD - RA2BE223J	22k ohm, 1/8W, 5%, Carbon	AA
349	VRD - RA2BE332J	3.3k ohm, 1/8W, 5%, Carbon	AA
350	VRD - RA2BE472J	4.7k ohm, 1/8W, 5%, Carbon	AA
351	VRD - RA2BE103J	10k ohm, 1/8W, 5%, Carbon	AA
352	VCT Y PA1EX473M	0.047µF, 25V, 20%, Ceramic	AA
353	VSDTC124F / / - 1	Transistor	AC
401	LX - WZ1020GE00	Cut Washer (4.2W-6.0-0.5)	AA
402	LX - HZ 3046GEFD	Screw BTN3P+6S (F)	AA

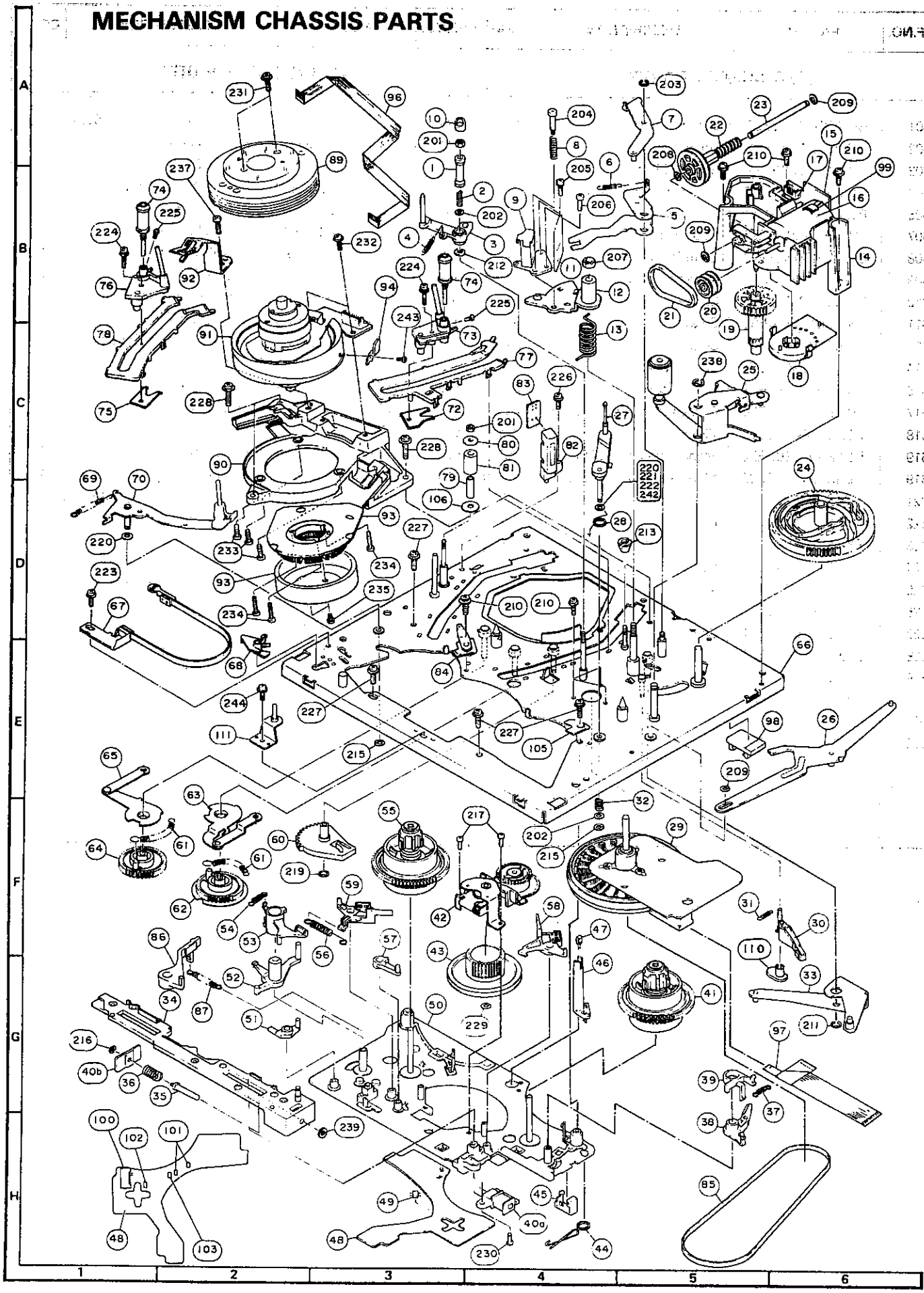
SCREWS, NUTS, WASHERS AND WIRE CLAMP

REF.NO.	PART NO.	DESCRIPTION	CODE
201	LX - NZ 3039GEZZ	Adjusting Nut	AA
202	XWHSD26 - 05060	Washer W2.6S-6-0.5	AA
203	XRESJ 20 - 04000	E Ring-2	AA
204	LX - BZ 3095GEFD	AC Head Screw	AA
205	XB PSD26 P06000	Azimuth Adjusting Screw	AA
206	LX - BZ 3096GEFD	Tilt Adjusting Screw	AA
207	XN FSD40 - 31000	Adjusting Nut (A/C Head)	AB
208	XWHJZ31 - 05054	Washer W3.1-5.4-0.5	AA
209	LX - WZ1041GE00	Washer W2.6-6-0.5 (LM)	AA
210	XH PSD26P06WS0	Screw C2.6P+6S	AA
211	LX - RZ 3001AEZZ	E Ring-3	AA
212	XWHJ Z45 - 02060	Washer PSW4.6-6-0.25	AA
213	LX - NZ4043GEFW	Adjusting Nut	AB
215	LX - WZ1003GE00	Washer CW2.1-5-0.5	AA
216	XRESJ 12 - 03000	E Ring-1.2	AA
217	XB PSD26 P03000	Screw 2.6P+3S	AA
219	XRESJ 25 - 04000	E Ring-2.5	AA
220	XWHJ Z25 - 05050	Washer W2.6-5-0.5	AA
221	XWHJ Z25 - 01050	Washer W2.6-5-0.13	AA
222	XWHJ Z25 - 02050	Washer W2.6-5-0.25	AA
223	LX - HZ 3043GEZZ	Screw W2.6P+6S	AA
224	LX - BZ 3099GEZZ	Screw WSW2P+11S-5W	AB
225	LX - XZ 3030GEFD	Screw M2×4	AC
226	XH PSD26P08WS0	Screw C2.6P+8S	AA
227	XJ PSD26 P08WS0	B Tight Screw C2.6P+8S	AA
228	XH PSD30P08WS0	Screw C3P+8S	AA
229	LX - WZ1040GE00	Washer CW2.5-6-0.5	AA
230	XJ BSD20 P06000	B Tight Screw 2P+6S	AA
231	LX - BZ 3039GEFN	Screw W3P+9S-Ni	AA
232	LX - HZ 3045GEFD	Screw S3P+8S-6W	AA
233	LX - BZ 3064GEFN	Screw SW3P+6S-Ni	AA
234	XB PSD26 P12J00	Screw SW2.6P+12S	AA
237	XH PSD30P06000	Screw	AA
238	LX - RZ 3001AEZZ	E Ring (Curl)	AA
239	LX - WZ1042GE00	Washer CW2.7-7-0.5	AA
242	XW HJ Z25- 04050	Washer W2.6-5-0.4	AA
243	XB PSD30 P04J00	Screw SW3P+4S	AA
244	XH PSD30P04WS0	Screw C3P+4S	AA

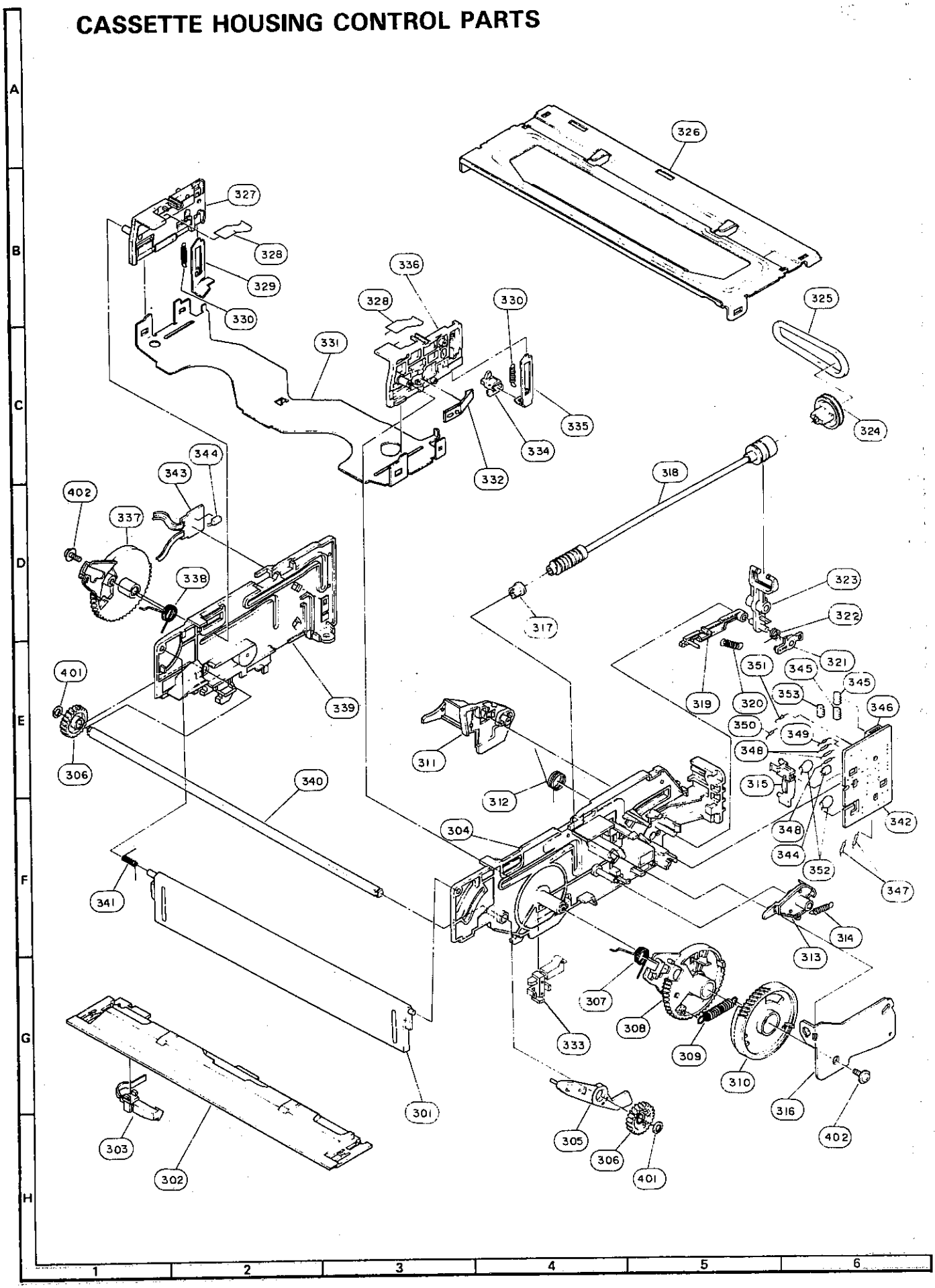
REF.NO.	PART NO.	DESCRIPTION	CODE
MECHANICAL PARTS			
601	GC ABB1081GEZZ	Bottom Cabinet	AR
602	GC ABA3044GES3	Upper Cabinet	AR
603	GB DYU3052GEZZ	Bottom Plate	AG
604	GC õ VA1537GEZZ	Antenna Terminal Plate	AF
605	P Z E TV0354GEZZ	Insulater	AE
607	LH LDP 1095GEZZ	LED Holder	AD
608	Q EARP0276GEFW	Earth Plate	AA
609	MS PRC0145GEFJ	Power Earth Spring	AA
610	XE BSD30 P12000	Screw	AA
611	XH PSD30P06WS0	Screw	AA
612	XE BSD40 P12000	Screw	AA
614	LX - HZ 3040GEFF	Screw	AA
615	LH LDF 1078GEZZ	PWB Holder	AA
617	LH LDZ 1614GE00	Fluorescent Display Holder	AC
618	T LABH 0434GEZZ	VR Label	AA
619	T LAB M1736GEZZ	Model Label (VC-780E)	AB
619	T LAB M1746GEZZ	Model Label (VC-790ET)	AB
621	J K NBP1051GESA	Slide Switch Knob	AD
622	LX - LZ 1001GEZZ	Push Ribet	AA
623	J K NBP1049GESA	Slide Switch Knob	AB
624	LH LDP 1089GE00	Power LED Holder	AA
625	LA NGF7060GEFW	Angle	AC
626	G LEG P9027GEZZ	Pad (R)	AC
627	LX - HZ 3047GEFF	Screw	AA
628	G LEG P9026GEZZ	Pad (L)	AC
629	G LEG P9030GESB	Decorative Foot Ass'y	AD
630	G LEG P9029GEZZ	Rear Foot	AB
631	PS PA Z0200GEZZ	Spacer	AA
633	TC A DZ3051GEZZ	SECAM Caution Label	AD

REF.NO.	PART NO.	DESCRIPTION	CODE
FRONT PANEL PARTS			
500	CP N LC1578GE01	Front Panel Ass'y (VC-780E)	BB
500	CP N LC1578GE02	Front Panel Ass'y (VC-790ET)	BB
501	C BTN - 2225GE01	Button, Ass'y, Power	AC
501-1	J BTN - 2225GESA	Button, Power	AB
501-2	GC õ VA1498GEZZ	Cover LED	AB
502	GD õRF1597GESA	Door (VC-780E)	AH
502	GD õRF1613GESA	Door (VC-790ET)	AH
503	TC AU H3179GEZZ	Dew Caution Label	AB
504	H BDGB3013GESA	Badge, "SHARP"	AC
505	GC õ VA1425GEZZ	Infrared Remote Control Filter	AC
506	H DECQ0541GESA	Decoration Plate	AG
507	H i NDP1569GESA	Indecation Plate	AG
508	J BTN - 2226GESA	Button, Eject	AB
509	J BTN - 2227GESA	Button, REC.	AA
510	LH LDZ 3035GEZZ	Holder	AD
511	PC õ VU9146GESB	Fluorescent Display Filter	AE
512	Q EARP0272GEFW	Earth Plate	AC
513	T LAB H0421GEZZ	Tuning Label	AC
514	T LAB Z0544GEZZ	C-Lock Label	AC
515	H DECP0220GESA	Door Decoration Plate	AF
516	LA NG F9360GES3	Angle	AE
517	LX - NZ 3014CEFN	Nut	AA
518	T LAB Z0536GEZZ	Titanium Coating Label (VC-790ET)	AC

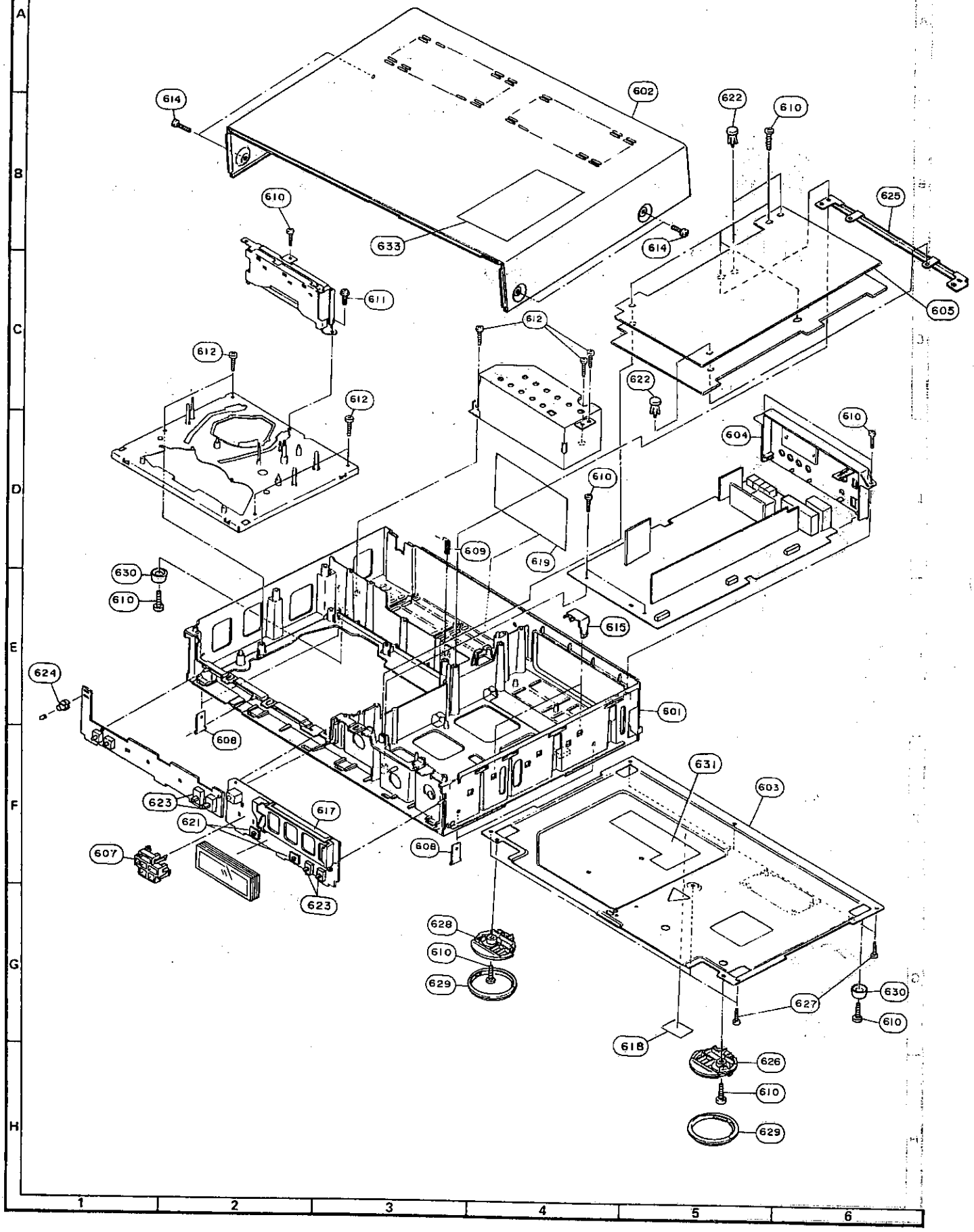
MECHANISM CHASSIS PARTS



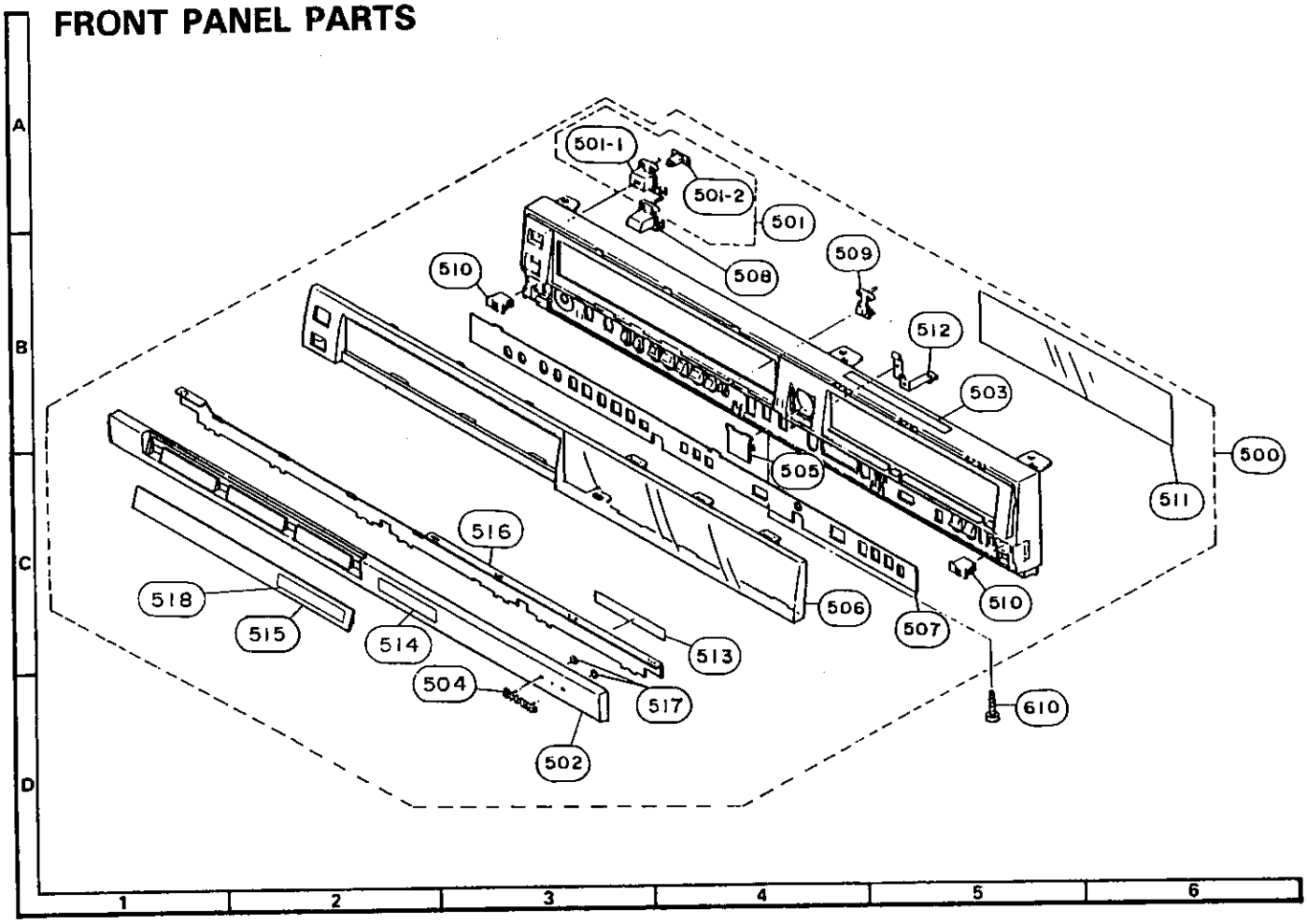
CASSETTE HOUSING CONTROL PARTS



MECHANICAL PARTS



FRONT PANEL PARTS



PACKING OF THE SET

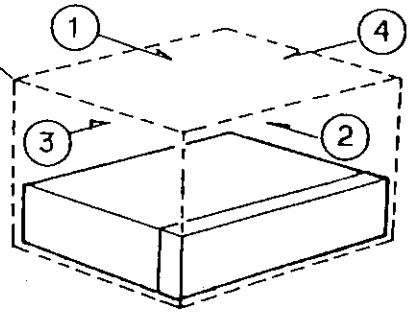
■ **Setting positions of the knobs**

Picture tone knob	at " Center click " position	Color mode switch (1)	at " Auto " position
Full auto switch	at " II " position	Color mode switch (2)	at " Mode 1 " position
Counter	at " PAL/MESECAM " position	Band selector switch	at " Normal " position
V-Lock	at " Best point " position	Test signal switch	at " Off " position
System	at " B/G " position	———	———

• Accessories

★ Ti NS - 1308GEZZ Operation manual
★ QCNW-2304GEZZ Antenna cord
★ UKōGD0015CEZZ Driver

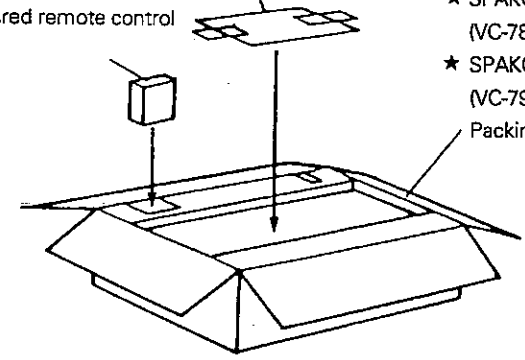
★ SSAKA0030GEZZ
Polystyrene Sack

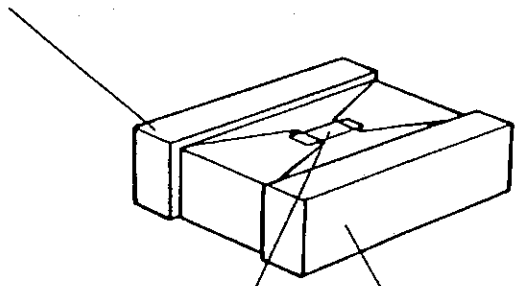


★ SPAKX0497GEZZ
Buffer material (Rear)

★ RRMCG0537GESA
Infrared remote control unit

★ SPAKC1553GEZZ
(VC-780E)
★ SPAKC1565GEZZ
(VC-790ET)
Packing case

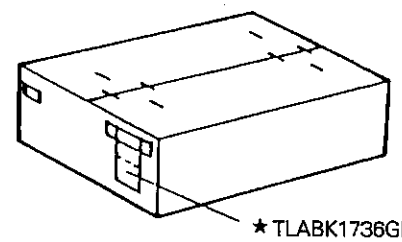




Fix with craft tape

★ SPAKX0497GEZZ
Buffer material (Front)

Use 8 staples to fix the bottom of packing case.



★ TLABK1736GEZZ (VC-780E)
★ TLABK1746GEZZ (VC-790ET)
No. Card

★ Not Replacement Items

T6847-S
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